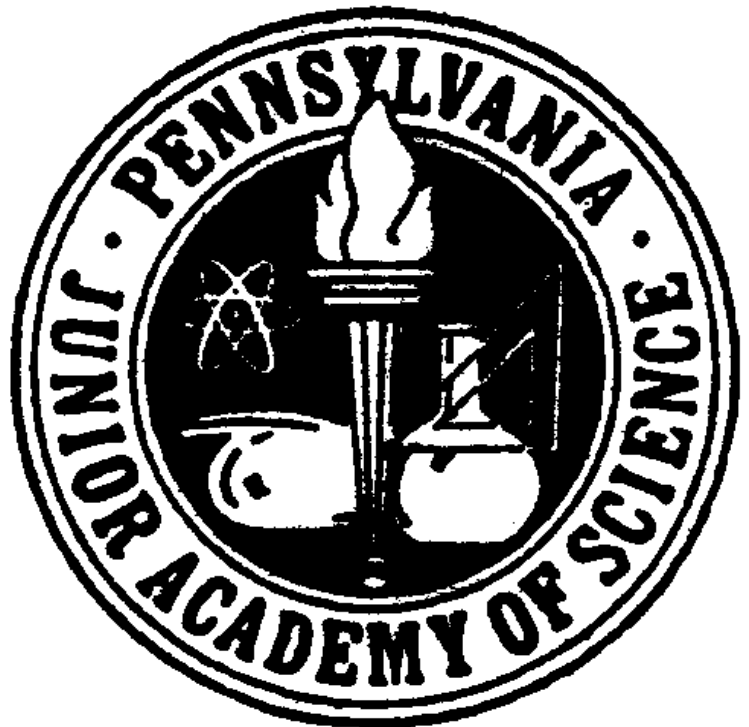


THE PENNSYLVANIA JUNIOR ACADEMY OF SCIENCE

Sponsor Handbook



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Short History of the Pennsylvania Junior Academy of Science

The Pennsylvania Junior Academy of Science (PJAS) is a statewide organization of junior and senior high school students designed to stimulate and promote interest in science among its members through the development of research projects and investigations.

The state of Pennsylvania is divided into ten regions. Each region consists of two or more counties. The region has one or more directors and a treasurer that oversee the operation of the region. At the state level there is a State Director, Secretary, and Treasurer. In addition, there are committees that coordinate the judging, awards, technicians, and growth at the state level.

In the early 1930's, a national executive committee was appointed by the American Association for the Advancement of Science (AAAS) to coordinate the activities of the various State Junior Academies of Science. Thus, the junior academy movement became an integral part of the organization with the formation of the National Junior Academy of Science (NJAS).

A paper presented at the Pennsylvania Academy of Science (PAS) at its West Chester meeting in 1932 resulted in the appointment of a committee to consider the development of a junior academy in Pennsylvania. As a result the senior PAS became the parent organization of the PJAS and still elects the Junior Academy State Director every three years.

Two years later, on March 31, 1934, at Reading, PA delegates from fourteen high school science clubs representing all parts of the state met and approved a constitution the next day. The Pennsylvania Junior Academy of Science had become a reality. Dr. Otis W. Caldwell, Columbia University, as an official delegate of the AAAS welcomed the new group. Pennsylvania was then added to the states of Indiana, Texas, Alabama, Arkansas, and others that had already established junior academies.

The first State Director was Dr. Karl F. Oerlein of the California State Teachers College in California, PA. He continued in office until 1941. The PJAS has continued to grow through the efforts and dedication of many adult sponsors and students. The early state meetings were held at various resorts and convention centers throughout the state. The last such convention was at Seven Springs Resort in 1990. Because of the enormous growth in the number of students participating the State Meeting was

moved to Penn State University at University Park, PA in 1991. In 2000 the school participation had grown from the original fourteen in 1934 to 424 schools. At the region level over 6000 students presented their research projects. The 2008 state meeting had 2115 presenters in over 210 units. The total number at the State Meeting including student presenters, technicians, sponsors and chaperones was almost 3300. Each year a different region hosts the State Meeting by preparing the program booklet, organizing the chaperone functions, helping to recruit judges and coordinating many of the activities. The Regions host in the following order: **Year ending in:** 0 - Region 9, 1 - Region 5, 2 - Region 10, 3 - Region 1, 4 - Region 8, 5 - Region 2, 6 - Region 7, 7 - Region 4, 8 - Region 6, and 9 - Region 3.

The following have served as State Directors:

Dr. Karl F. Oerlein	1934-1941	Mr. Edward Testa	1985-1989
Miss Mary Hawthorne	1941-1944	Mr. Joseph Durkin	1989-1996
Mrs. Marie K. Overholts	1944-1945	Mr. James W. Maloy	1996-2002
Miss Sophie Moiles	1945-1958	Mr. Peter Carando	2002-2008
Mr. Charles L. Bikle	1958-1964	Dr. Laura Fisanick	2008-present
Mr. Robert E. Hansen	1964-1967		
Mrs. Carolyn A. Gibson	1967-1971		
Sister M. Gabrielle, Ph.D.	1971-1976		
Mr. Joseph A. Gennaula	1976-1979		
Mr. Clarence Myers	1979-1985		

The Pennsylvania Junior Academy of Science is a non-profit organization, tax exempt under Section 501(c)(3) as described in Section 509 (a)(3) of the Internal Revenue Code, and files form 990 – Return of Organization Exempt from Income Tax, on an annual basis. The Academy is also a registered charitable organization in the Commonwealth of Pennsylvania, and therefore, is authorized to solicit contributions within Pennsylvania.

The PJAS Federal Employer Number (EIN) is #23-6396183. The Pennsylvania Bureau of Charitable Organizations (State Certificate Number) is #14563. PJAS is audited yearly by Wildeman and Obrock Certified Public Accountants, 515 South 29th Street, Harrisburg, PA 17104-2104.

Fees charged for the regional meetings, state meetings, and gifts from individuals, foundations, and industry support PJAS. **All of the region directors and state officers are volunteers and are not paid a salary for the time that they dedicate to the organization and the students.**

PJAS Goals

The Pennsylvania Junior Academy of Science sponsored by the Pennsylvania Academy of Science, as an Affiliate of the American Association for the Advancement of Science is organized with the following objectives:

- To promote greater participation in science and mathematics activities among the youth of Pennsylvania.
- To improve the quality of achievement in mathematics and science by encouraging students to participate in research and develop original ideas.
- To develop an understanding of the scientific community through close association with leaders in the sciences.
- To seek the improvement of science clubs activities through the cooperative regional and state meetings.
- To inculcate among its members true scientific attitudes and humanistic ideals that shall lead to the greater development of service to man.

Student Participation – Student participants in the PJAS program are encouraged to follow the scientific method to select a project, research the background, formulate a hypothesis, develop an experiment to prove or disprove the hypothesis, and to collect and analyze data from their experiment. The students then prepare a written report and give an oral presentation with audio-visuals to their sponsor. **Group projects are not permitted.**

Students who are selected at the school level then are registered to present their project at the regional meeting. The regional meetings are usually in February or early March each year. The students at the regional meeting are divided into units of around ten students who are all in the same area of scientific research, such as chemistry. A panel of two or more judges then evaluates the student's project presentation against set criteria. The students can receive a first, second or third award on their project. Each unit can have more than one first award. Students who receive a first award are then eligible to go to the State Meeting at Penn State University the third weekend in May.

The judges at the regional and state meetings are sponsors, graduate students, college professors, and scientists from industry. PJAS has developed a set of guidelines for judging the student presenters along with a briefing format to assure that the judging is consistent throughout the state.

So you have decided you want to sponsor students, now what do you do?

First you have to answer some questions for yourself about your commitment.

- Are you willing to put in the time to sponsor projects?
- Are you willing to do the work for no money since most school districts do not pay sponsors?
- Will the school district pay the expenses for the Regional and State competitions?
- How will you recruit students to participate?
- Will you require the projects for a class?
- Will the projects be extra credit?
- When will the students work on the projects, during class, at home on their own, or after school?
- What other activities and sports will influence student participation?
- Will other teachers help you with the projects and students?
- Will the parents become involved?
- How will you decide who goes on to the PJAS regional competitions?
- Will the projects be used to complete the PA Department of Education, Chapter 4 requirements for a graduation project?
- Who will judge these?

Where to start? First contact your local Region Director (**See Appendix 1 and 2**) and obtain the names of sponsors at schools near you. Talk to these people and find out how they coordinate their students and how they spend their time and energy. Find out what is involved in completing the projects. Discuss with the Region Director the requirements for registration, student quotas for your school, cost, deadlines, future meetings, and other information to get you started.

What areas are used for doing projects? The projects are divided into the following fields:

- Behavioral/Psychology
- Biochemistry
- Biology
- Botany
- Chemistry
- Computer Science
- Earth and Space
- Ecology
- Mathematics
- Microbiology
- Physics
- Zoology

Project Forms: The Region Director can provide you with *Project Outline* forms. Projects that involve humans (Behavioral/Psychology) and animals (Zoology) always require special permission forms, which vary from school to school. Even projects where students are doing taste tests between colas require parental consent forms. The booklet *International Rules for Precollege Science Research and Guidelines for Science and Engineering Fairs* is available from **Society for Science and the Public**, 1719 N Street, NW, Washington, DC 20036-2888. You can also contact them by phone (202) 785-2255 or via the Internet at <http://www.societyforscience.org/ise/>.

Preparation for the Region Competition

What do you have to do for the Region Competition?

Registration: PJAS requires that each teacher sponsor no more than fifteen (15) students at the region competition. Thus, if you are going to have more than fifteen students you need to find someone to help you or limit the number of students. Some regions due to the large number at their Regional Meeting also set quotas on the number of students from a school. Quotas are set most often with middle schools. Each student **must** be registered for the region competition. The region has a **deadline** when these registration forms must be turned into the Region Director. There is a **school membership fee** that is paid to the region. If you have middle school and high school students in the same building there is only one fee. If the students are in separate buildings there is a fee for each building. The **school membership fee is \$50.00** per school; however, this varies with each region depending on expenses. These fees vary depending on if lunch is provided, cost of the booklet and awards, and if the region must rent facilities and has other meeting expenses. **These fees are to be paid before the Region Competition. If a student decides not to attend the Region Competition the fee is not returned.**

Presentation Units: After the student is registered the region divides the students into units of approximately ten students. The units are divided according to grade level and research area. For example, all seventh grade chemistry projects are placed in the same unit. Some units may overlap if there are not enough students in a given research area. The region prepares a meeting booklet, which lists all of the students, their unit, the room where they will present, and the agenda for the day.

Judges: Each sponsor is expected to recruit one adult judge for every three-(3) students they take to the region competition. Teachers, parents, and school board members are great judges. Students that have participated in PJAS and who have graduated from high school are excellent judges since they understand the program.

Technicians: Sponsors are expected to bring one student technician for every ten-(10) presenters they take to the region meeting. The technicians are used to time the presentations and to transport overhead projectors to the presentation rooms. These can be any student that you are sure will show up to help.

Parents: Some regions permit and some regions do not permit parents and guests into the presentation rooms to hear the students. Check with your Region Director for the region policy. The parents and guests are not permitted to make any comments during any of the presentations or to ask questions after a presentation.

Recording: The use of tape recorders or camcorders is not permitted during student presentations.

Presentations and Judging: There is normally a thirty-minute briefing of the judges before they are sent to hear the student presentations so that the judging is consistent between the units. **The decision of the judges is final and can not be appealed.** Each unit can have any number of first, second and third awards. The students are competing against a specific presentation criterion and not against each other.

Awards: The region has an awards assembly after the presentations to announce the results. Students that earn special awards are to complete the *Photo Permission Form* so that their photo can be submitted to a local newspaper by either the sponsor or the region.

First Award Students: All students who receive a first award are eligible to go to the State Competition at Penn State University, University Park Campus the second or third weekend in May.

Preparation for the State Competition

What do you have to do for the State Competition?

Registration: Students who have received First Awards must be registered for the State Competition. The students are housed two to a room at Penn State. *You must notify the Region Director two weeks after the Region Competition, which students are going and which students are not going.* Also, you are to list any technicians you are taking, sponsors who can judge at the State Meeting, and adult chaperones who do not judge but will be supervising students.

Adults: You are required to take one adult sponsor or chaperone for every FIVE students you take to Penn State. **THERE MUST BE MALE CHAPERONES FOR MALE STUDENTS AND FEMALE CHAPERONES FOR FEMALE STUDENTS.** The adults are expected to keep track of their students and to help chaperone the various student activities. It is not a time to vacation or to go downtown and party. The adults have a very important function.

Authorization for Medical Treatment: Each student presenter and technician, even those over eighteen, is required to complete **three originals** (not photocopies) of the health authorization. The person authorized to sign for the student *must be someone on campus* with the student. Send two copies to the Region Director and you keep one copy. For Adults complete the **Authorization for Adult Medical Treatment** form. The Region Director turns in his/her two copies to the nurses at Penn State. These are used to note any treatment the student may receive while on campus and medication the student may take. One copy is taken to the hospital with the student for more serious injuries. If your student requires hospital treatment you and/or the Region Director will go to the hospital with the student.

Cost: These fees may change each year at the fall Director's Meeting depending on the change in costs of the meeting. The state fee covers five meals, two nights in the dorm, the program booklet, and the award bar. The fee also covers the Penn State judges, who are hired, the rental of rooms at Penn State, hiring nurses for 24-hour coverage, security police, and many other expenses. Some regions also charge a fee for bus transportation. **These fees are to be paid before the State Competition.** Be aware that students may back out and not go at the last minute because of sports, the prom, graduation, and AP exams. **The fee is required for any student or adult who does not cancel their reservation by April 1.** We are expecting them at Penn State and expenses are incurred even if they decide not to go at the last minute.

Behavior: There is a behavior code for the students. Students and adults who do not observe the rules are sent home. Every year we send someone home. Remind the students that PJAS is a school activity and all of the rules at your school apply at Penn State.

HOW TO GIVE A PJAS PROJECT PRESENTATION

Your project is not original research; but, is an experiment that you have researched, completed very well, and repeated several times. The **problem** is that the PJAS judges only know you and your work through what you tell them in your 5 – 10 minute presentation. **Remember:** you probably know more about your project than the judges. You must convey your knowledge to them.

How do you make yourself appear to be a top rate student in the 5 to 10 minutes that you have the floor?

Suggestions for a Great Presentation:

First: Stand up straight. Get rid of the chewing gum. Dress professionally. Learn how to use the overhead/computer before the presentation. Do not read your presentation. You may have note cards; but, don't stand there and read them.

The PJAS judges and their grading check list look for the following items.

1. State your name, school, grade, and the number of years you have presented at PJAS. If you are a junior or senior and this is your first time go for the pity factor. At Cal U you are up against some students who started doing projects in the 7th grade.
2. State the **TITLE** of your presentation.
3. Discuss **WHY** you selected your project. e.g. "I decided to study human horsepower because I live on a farm and I am interested in machinery."
4. Discuss what **PROBLEM** you are trying to solve with your project.
5. State your **HYPOTHESES**.
6. Discuss the literature **BACKGROUND** of your project. You should spend only about two to three minutes on the background. Your presentation is not a library research project. If you are studying laundry products, what did *Consumer Reports* have to say about them?
7. You must display a firm understanding of the basic scientific principles involved in your experiment. Thus, if you are measuring pH you should be able to explain in detail what the pH scale is, how it is calculated, and what the pH scale means should you be asked.
8. As you discuss **TERMS** in your presentation explain them. For example, Newton – the unit of force in the metric system named after an English Physicist who developed the laws of motion.
9. Explain in detail your **EXPERIMENTAL** set up and the equipment you used. Overheads are very good to do this quickly and clearly. If you are using data collection software give complete credit to the company. e.g. "Vernier Logger Pro temperature software." Do not say, "Some software my teacher gave me."
10. If you used some original material or methods in your project be sure to discuss them. e.g. "I used Chip Clips to hold the material while testing its tensile strength."
11. Show all the **DATA** you collected on overheads. **Remember**, you need to do at least three trials and then average the results. Everything **MUST be in METRIC**. Using pounds, inches, miles, Fahrenheit, etc will ensure that you do not get a first award at Cal U or an "A" in the your class. Also remember that kilograms are for mass and Newtons are for weight and the terms are not interchangeable.
12. Show on overheads any equations you used and example **CALCULATIONS**. Explain the terms in the equations

13. Show in detail how your data was used to arrive at you **CONCLUSIONS**. Plots, line graphs, and bar graphs show this very well. Show that your conclusions are valid from the data you obtained.
14. Restate your **HYPOTHESES** and explain why it was correct or incorrect according to your data and results.
15. Suggest areas where you may have made **ERRORS** in your experiment or areas where your experiment could not explain the results. Math errors are not an experimental error.
16. Suggest areas for **FUTURE RESEARCH**.
17. Conclude the presentation and ask for **QUESTIONS**.
18. Remember the maximum time is ten (10) minutes for your presentation.

Other Notes:

The PJAS judges may ask you questions for only five (5) minutes. If you do not know the answer, say so. Do not try to bluff your way through. How well you answer the questions affects your score.

Presentations can be digital but must be saved as a PDF document. If you are still using overhead transparencies then get your teacher to make any overheads that you need. Set up your presentation on Power Point and print it out in black and white. You can make the overheads in color if you have a color printer.

Otherwise, all other material must be printed or written in black ink on white paper. No notebook paper, colored markers or pencil are to be used. The material should not be larger than 7½” x 10” in size. Leave at least a 1” margin around an 8½” x 11” sheet of paper.

Practice, practice, practice, practice, practice, practice, and practice before the presentation.

Practice at school, after school, and at home. Your presentation is judged against a set of PJAS judging standards. However, the judges are also comparing your talk to the other students in your PJAS unit. And, if they are much better than you, your score will suffer. Remember, we want to take you to Penn State in May.

Do your best!

PJAS STATE JUDGING - THE SHORT COURSE

General Nature of PJAS Competition

Students wishing to present their researches for PJAS competition are grouped into units with other students of similar grade and category of research and evaluated by a small team of judges. Students give timed oral presentations about their projects after which judges may ask questions for a timed period. Judges score the student on their individual worksheets after each presentation. The student is rated numerically by his success in each of 5 independently-evaluated criteria. Later when all students in the unit are finished the judging team returns to Judging Headquarters to obtain the official tally sheet. On that paper they will compile their individual scores into a composite average score for each student.

General Procedures for Judges

1. Judges, who are selected by the Judging Committee, will show knowledge of the field he or she is judging as demonstrated by academic degrees or experience in the field.
2. Each new judge will submit a registration form to the Judging Committee.
3. Each new judge will attend an orientation session conducted by the Judging Committee.
4. Judges are responsible for working with the room technicians to make sure proper competition conditions are established in the Presentation Room. *Judges should make sure that a timekeeper is available with an official log sheet and that the projection equipment is working properly. It is imperative that no one enters or leaves the room during the presentation. Judges must maintain proper decorum inside and outside the room so that no student can be interrupted during his presentation. We suggest that a member of the judging team explain these operating procedures to those in the room at the beginning of the session.*
5. Judges are responsible for identifying student participants and determining the sequence of presentations. Each student will give his presentation in the order listed in the program book. Judges may make an exception for unusual circumstances, such as special interviews, multiple-projects, or such wide disparity in grade levels in a mixed room that they prefer to hear the youngest ones first.
6. Judges may NOT add a student to their unit without official written notice from the registration committee or its representative.
7. Students are not in competition with each other for some single top award; rather they are evaluated on how well they succeed in fulfilling the 5 PJAS State Criteria. Therefore, there is no limit to the number of each award that may be awarded in a given Presentation Room.
8. Each judge's evaluation of the presentation shall be made independently from other members of the judging team. However, after all the presentations have been heard, judges are encouraged to consult with one another in determination of the final awards.
9. It is important that all judges in the team return to the judging headquarters when the individual worksheets are completed to record their scores on the official tally sheets. All worksheets and the tally sheet must be personally signed when they are submitted. Furthermore, judges are often called upon to fill out individual comment sheets on the students or make recommendations about special awards for which they may be eligible.
10. Awards will be solely based on the mathematical averages of the scores. But judges should be aware that data entry into the computer scoring program is by using the individual judge's scores in each of the 5 criteria.
11. Room Technicians. The judging team will be assisted in the presentation rooms by one or more technicians. Their duties are to:
 - a) Act as a timekeeper, using flash cards to aid the participant and judges, recording the times on the official log sheet.

- b) Set up the audio-visual equipment, aiding its use during presentations, and returning equipment at the end of the session.
- c) Control the door and hallway so that the participant is not distracted during his presentation. *In rare cases where no technician is available, judges may NOT serve as timekeepers themselves. They should make arrangements with student presenters to serve as timers. Students at the front or back end of the "batting order" are usually more amenable to this request.*

12. Remember these PJAS participants are CHILDREN who are just beginning to work and think as scientists; they are not Ph.D. candidates
13. Questionable Research Topics. Judges should know that PJAS adheres very closely to the rules and procedures of the International Science and Engineering Fair regarding living vertebrate and human subjects, recombinant DNA, tissue acquisition, the use of lasers, and the use of controlled substances.

Before any such experimentation can be registered for regional competition the student and his sponsor must submit detailed research plans and obtain a series of certifications and clearances to ensure proper adult supervision during the planning and execution of the project.

For a project in the above list to appear at a Regional or State PJAS competition, the judge must assume the project has met the necessary qualifications at the regional level. The judge is welcome to ask the Judging Committee to check the validity of the certification that resides in the hands of the Regional Director.

More precise details about the certification process can be obtained from the booklet *PJAS Rules and Regulations for Conducting and Judging of Student Research* or *The PJAS Sponsor Handbook*.

PJAS Presentation and Scoring Rules

The participant's research and presentation must conform to the following rules:

1. Each research will be judged on its own merit in meeting the Criteria for Judging rather than in competition with other research.
2. Eligibility. The student doing the presentation must be the one who conducted the research. (ABSOLUTELY NO SUBSTITUTES).
3. No student may present a research topic from a previous year without conducting significant additional research on the topic during the current year.
4. Presentation specifics:
 - A student shall not be interrupted during his/her presentation.
 - No three-dimensional objects may be used in the presentations.
 - PJAS is making the transition to digital student presentations. However, in many cases the presentation will be done using the traditional method of overhead projector and transparencies

For Digital Units: Digital is permitted only when PJAS provides the computer. Students will be notified in advance whether or not they will be in a digital unit. Slides may contain text and graphics ONLY. Animations, music, and sound effects are not permitted. Presentations must be saved in PDF format. One way to create a digital presentation is to use PowerPoint, then convert to PDF. If overhead projectors are available, students in digital units may choose to use transparencies instead of digital. A student's score should not be lowered because of this choice.

For Traditional Units: Visuals should be in the form of transparencies, projected using an overhead projector.

Transparencies should be neat and easily visible to all in the presentation room.

- Visuals are to be used to enhance and supplement the talk, but not to replace the speaker.
- The actual experiment may not be used in the presentation. No materials may be passed to the judges during the presentation.
- Only a PJAS technician or person authorized by the Judging Committee may assist with the use of the audiovisual equipment.
- In cases of doubt as to the appropriateness of a presentation, the State Judging Committee will make the final ruling.

5. Measurements must be in metric except where highly specialized equipment is calibrated in other units. Presentations in which the measurements were not done in metric will not receive a first place award, regardless of score.
6. The presentation will not exceed a maximum time limit of 10 minutes and will be given proper notice by a timekeeper. No reduction in score will be given for a presentation of less than 10 minutes. Presentations **exceeding 10 minutes will not receive a first place award**, regardless of score. There will be a grace period of approximately 10 seconds before this penalty is applied.
7. Upon completion of the presentation the researcher may be questioned **BY THE JUDGES** for a time period of **NOT MORE THAN 5 MINUTES**. Judges may ask questions to seek clarification of a student's methods, conclusions, and/or understanding. It is inappropriate for judges to criticize or comment on a student's project.
8. The researchers may use notes in their presentations but reading the report to the judges is considered bad form.
9. Scoring specifics. Each category of the Judging Criteria shall be scored on a 5 point **integer** system: **(Excellent) 5 - 4 - 3 - 2 - 1 (Unacceptable)**
10. The student shall receive award based on the average score per judge, calculated by the following formula:
Average Score = Total Score of All Judges 5 x (Total Number of Judges)
11. The standards for awards at the State Meeting are: 1st award - average score 4.0 or higher 2nd Award - average score 3.0 or higher 3rd Award - average score below 3.0
12. Judges may not disqualify a student. It is the responsibility of the Judging Committee to decide disqualifications.
13. Questions concerning infractions of the State Rules for Judging are subject to the investigation and ruling of the Chairmen of the State Judging Committee and the Regional Directors if appropriate.
14. Non-PJAS Awards. Judges should be aware that outside agencies often are interested in rewarding some of our participants, identified either by judges' high scores or a set of criteria of their own.
15. The only persons permitted in a presentation unit are assigned presenters, assigned judges, and assigned technicians. Exceptions must have written permission from the regional director. This written permission must be given to the judges in the unit.

PJAS Judging Criteria

General comments on the criteria: Note that of the 5 criteria to be used to evaluate the student, two (Presentation and Judges Opinion) are the same in all three of the research fields chosen (science presentations, math presentations, and computer science presentations). The other three criteria are referring to content of the project and will vary according to the nature of the specific discipline. The official criteria will appear here in bold face print with discussion or suggestions as to interpretation found in regular print.

Science Presentations

SCIENTIFIC THOUGHT - *Selection and statement of the problem, experimental validity and value, scope of design.*

The ultimate aim of science research is to promote new knowledge and understanding of the world in which we live. From reading and observation one comes up with a basic concept. This idea permits formulation of a meaningful question or hypothesis to which an answer may be found through a suitably designed experiment.

Thus judging the “scientific thought” criterion involves consideration of such questions as:

- a) Does the student exhibit sufficient background understanding of the principles and concepts involved in the topic?
- b) Is there a significant basic thought in the project? Is it clearly stated?
- c) Does it admit formulation of an age-appropriate meaningful question?
- d) Is the scope of the problem sufficiently limited to permit a meaningful experiment?
- e) Is there a single, formal hypothesis?

EXPERIMENTAL METHODS- *Choosing/developing techniques for valid analysis. Use of original materials or using old materials in an original way. Proper controls and sample size.*

This criterion refers to the details of a **well-designed experimental procedure** intended to answer the question posed. The project may require designing, building and using material hardware. **The presenter must design and carry out his/her own experiment.**

- a) Is the project well designed for the problem at hand?
- b) Is the experiment basically sound, with sufficient sample size and control of variables? Did the experiment have both a control group and experimental group(s)?
- c) Does the procedure follow a logical sequence?
- d) Have any original or ingenious materials or methods been used?
- e) Were results measurable/quantifiable and done in metric?

ANALYTICAL APPROACH - *Ability to draw valid conclusions. Full use of data and findings. Interpretations of weakness of design. Suggestions for further research.*

Book reports and research theories unsupported by practical data cannot achieve success in PJAS competitions because of this criterion. The student must have personally accumulated some actual data to analyze, even if the trend is negative or neutral to his hypothesis. The critical thing for a student to exhibit to judges is that he knows what the data MEANS.

- a) Is the body of data sufficient to draw valid conclusions?
- b) Do the conclusions refer back to the original question or hypothesis?
- c) Is the student grouping the data properly to enable comparisons between groups? Is the data fully used to draw conclusions?
- d) Is he evaluating the significance of his own data properly?
- e) Has the student thought about how his experiment could be improved if it were to be repeated? Is he aware of sources of error?
- f) Is the student able to make suggestions for further researches related to his topic or perhaps see a practical application of his findings to the real world?

PRESENTATION - *Ability to convey the information gained to others. To demonstrate new and improved ways of expressing and communicating scientific ideas.*

The presentation should, preferably, be in the form of a free talk employing good oral communication skills. The time restrictions in the rules necessitate planning and rehearsal. The critical question is “When the student is finished do you understand exactly what he did and why?”

- a) Does the talk cover all the essentials of the project - the basic premises, the hypothesis or problem, the experimental methods, the data, and the conclusions?
- b) Is the talk well-organized and flowing in a logical pattern?
- c) Do the audiovisual aids enhance the audience's understanding?
- d) Does the student demonstrate through the presentation and his responses during the questioning period a firm understanding of the basic scientific principles involved?

JUDGE'S OPINION - Consider the age level and project correlation when necessary. Also, your overall feeling of the problem and the quality of the student's work. This criterion covers simply the judge's overall reaction to the nature of the project and its handling by the student.

Mathematics Presentations

Mathematics presentations are expository in nature, not experimental.

Appropriate projects should either be of a level beyond what the student is currently studying or on an enrichment topic.

FULFILLMENT OF PURPOSE -

- a) Did the presentation have focus?
- b) Considering the topic and time allowed, was the scope of the presentation suitable?
- c) Did the student use appropriate mathematical vocabulary?
- d) Did the student show depth of understanding of mathematical concepts and principles?

CONTENT

- a) Did the presentation have specific and illustrative content?
- b) Was the presentation free from mathematical errors?
- c) Is there a practical application or any correlation or interaction with other disciplines?
- d) Did the student use correct mathematical notation?

DEVELOPMENT

- a) Was there unity, coherence and inherent logic in the sequence of ideas?
- b) Does the student show insight?
- c) Does the student show sufficient examples or counter-examples?
- d) Can the student make suggestions as to related topics needing further investigation?

PRESENTATION

The presentation should, preferably, be in the form of a free talk employing good oral communication skills. The time restrictions in the rules necessitate planning and rehearsal.

- a) Is the talk well organized and flowing in a logical pattern?
- b) Do the audiovisual aids enhance the audience's understanding?
- c) Is the quality of exposition of a high degree?
- d) Is the student's competency with the principles such that he can answer questions with clarity, and elaborate where necessary to make a point?

JUDGE'S OPINION

This criterion is an overall subjective evaluation of the student's work considering age level, depth, complexity of the subject matter, as well as the student's success in achieving his purpose or objective.

Computer Science Presentations

PROPER PLACEMENT DECISIONS. As in the mathematics projects this category is expository in nature of its presentations and seldom involves the controlled experiments required of science projects. Judges, sponsors and students must realize that projects that do have data accumulated in a controlled experiment where the computer's role is merely to serve as a tool to analyze the data, draw pretty graphs, and do statistical conclusions *DO NOT BELONG IN THE COMPUTER SCIENCE* category. Such projects more properly fit the judging criteria for the specific science field such as biology or physics in which the project was done and should be transferred there before being judged.

The PJAS State Judging Committee feels that a small modification of a pre-existing (canned) program is not a suitable project to present in our competition. Pre-existing programs may be used, however, if they are a small part of the student's own work.

A wide disparity exists between schools in their offerings of formal computer science courses. It is the task of the judges to identify students who have gone beyond the standard opportunities provided by their schools.

STATEMENT OF THE PROBLEM

- a) Is the objective of the project clearly stated?
- b) Does the problem chosen have relevance or practical application in today's world?
- c) Did the student use appropriate computer vocabulary?
- d) Did the student show depth of understanding of relevant programming concepts and principles?
- e) Does the project entail creative thinking in approach techniques?

METHODS

- a) Was there unity, coherence and inherent logic in the sequence of the presentation?
- b) Does the student follow accepted procedures, using either structured programming or object-oriented programming? Is the underlying logic sound?
- c) Did the student explain the project design using a high level diagram?
- d) Did the student include an explanation of difficult, unique and/or significant section(s) of the program?

FULFILLMENT OF PURPOSE

- a) Did the student show the results of his work? Was the objective obtained?
- b) Does the student have a quality product?
- c) Did the project include exceptional features and/or coding?
- d) Does the presenter know of areas for further expansion or improvement of the project?

PRESENTATION

The presentation should, preferably, be in the form of a free talk employing good oral communication skills. The time restrictions in the rules necessitate planning and rehearsal.

- a) Is the talk well organized and flowing in a logical pattern?
- b) Do the audiovisual aids enhance the audience's understanding?
- c) Is the student's competency with the principles such that he can answer questions with clarity, and elaborate where necessary to make a point?
- d) If the student is employing special medium, such as a VCR or computer screen, is its value to the speech significant? Was its use limited to less than 10% of the total speech?

It is acceptable for a student to show key parts of code line by line. However, the presentation should not consist of a student explaining his/her program line by line. A high-level method should be used instead.

JUDGE'S OPINION

Evaluate the complexity and quality of the project with respect to the age and grade level of the student and the amount of previous experience with computers. Remember schools vary considerably in what computer offerings they can make available to students.

General Notes on the Use of Visuals

- a) No 3-D objects are permitted. Nothing may be passed to the judges.
- b) Acceptable presentation media include digital visuals or overhead transparencies.
- c) Judges are reminded in their briefing that schools vary considerably in the types of equipment that they have available to make visuals. Content is important, not color and visual enhancements.
- d) PJAS presentations are an educational activity. For this reason, presentation visuals (transparencies/slides) must be clearly visible to all in the presentation room.
- e) Before using any specialized media, please review the pertinent section of the Short Course: PJAS Presentation and Scoring Rules, #4 – Presentation Specifics.

This Short Course (revised 10/12) is an excerpt from Pennsylvania Junior Academy of Science Rules and Regulations for Conducting and Judging of Student Research

What to Bring and Not to Bring to the State Meeting

Copy and distribute to all adults and students attending the State Meeting.

What to Bring

- Your Project - all of your presentation materials (note cards, transparencies, posters, and pen or pencil)
- Dress will be casual for all events, except that you will need dress clothes for your presentation. You will be walking long distances so wear comfortable shoes and be prepared for the weather. You may wish to bring a swimsuit.
- You will need towels (at least 2), pillow, blanket, soap, shampoo, deodorant, other toiletries, hair dryer, flip-flops for the shower. An alarm clock would be a good idea.
- **Bedding: Sheets are provided. Pillows and blankets are NOT provided.**
- Money for lunch on the way to and from Penn State, if a stop is planned.
- Any medication that is needed for medical problems such as allergies, asthma, diabetes, etc.

Optional Items

- Money for PJAS T-shirts and sweatshirts, Penn State items, video games, between meal snacks. Small bills and quarters are preferable to larger bills.
- Athletic equipment (basketball, volleyball and/or tennis racquet)
- Snacks. Rooms are equipped with a small refrigerator and microwave.

What NOT to Bring

- Boom Boxes, Radios
- Laser Pointers
- Roller Blades, Skates, or Skateboards
- Water Guns or Super Soakers
- Alcohol and/or illegal drugs
- Candles or incense
- Any item that may cause injury to you or others.
- **Penn State Security reserves the right to confiscate any items that may cause injury or be hazardous to you or others.**

General Directions for the State Meeting

Copy and distribute to all adults and students attending the State Meeting.

PJAS State Meeting – Penn State University, May _

Participants from all regions are expected to follow the rules.

Registration for Everyone Staying on Campus: Findley Commons, Sunday, May __, 1:00 p.m. to 5:00 p.m.

Registration for day packages NOT Staying on Campus: Your registration will be at a separate time and place. **Contact your Region Director for the location and time.**

Housing: Students and adults will be housed in the East Halls complex and/or other dorm complex with two persons per room.

Parking: The designated parking lot for PJAS cars and vans changes each year due to Penn State construction and other needs. Follow the PJAS signs and the Penn State Police will be there to direct you. Vans and cars **will need parking tags**, which are available at the registration area. **Contact your region director for the cost and location.**

Sponsors and chaperones: Please realize that your job is a huge responsibility.

- Arrange regular check-ins with your students. Set up a meeting place and time and require all students to report to you at that time. It is suggested that you eat with your students.
- Check rooms on arrival and departure for any conditions that need attention. Students will be charged for room damage.
- Make a bed check each night at curfew time. Assure that the students stay in their assigned rooms.
- Inform students of YOUR room number and the name of their Regional Director.
- You should have the name, address, and phone number of parents of all your students. It is best if you carry this information with you.

Room Keys:

- Sponsors are to pass out room keys and meal cards to each student.
- On Tuesday morning sponsors are to collect and check off the student name and key number. The list and the keys are to be turned in directly to your Region Director.
- **The charge for lost or missing keys is \$68.00** The region/student/school will be assessed this fee.

INSIST ON PROPER BEHAVIOR.

- No running, no throwing, no horseplay are permitted at any time.
- Female students are not allowed in male dorms; male students are not allowed in female dorms.
- **Students must wear their nametags at all times.** Nametags must be on the lanyard, worn around the neck with name clearly visible from the front.
- Nametags must not be worn on pant legs and belts.
- All students must observe all curfews and must be quiet after lights out.

All sponsors and chaperones should feel free to correct any student who is acting improperly. Determine which region the student is from and report the student to your region director who can then report to the student's region director.

The answers to most questions can be found in the state booklet. If you have additional questions, there is an **information desk** in the Findley/Johnston Commons.

A little preparation work with your students will prevent many problems. Have each student check the booklet to find the project-judging unit to which he/she has been assigned. Make sure that each student knows the time and location for the unit. Campus maps are provided. If there is a problem, see your regional director.

Duties of Presenters, Sponsors, Chaperones, and Technicians at the State Meeting

Copy and distribute to all adults and students attending the State Meeting.

There are mandatory meetings for presenters, sponsors, chaperones and technicians on Sunday evening. Please read your PJAS program booklet for the time and location. Please be on time.

Presenters

Presenters are expected to study the **schedule** listed in the front of the state booklet. Attendance is **mandatory** at all meetings, sessions and ceremonies. It is your responsibility to be present and on time.

Check the state booklet immediately for your **presentation unit**. Make sure that you know the time and location of your judging unit. Campus maps are provided. Shuttle buses are available.

If there is a **problem** (i.e., not in program booklet, wrong category), tell your sponsor at once. You and your sponsor should report to one of the unit change sessions listed in the booklet.

There are a number of **special awards** (listed in the state booklet). If you receive a first place award, you must attend the Special Awards Ceremony Monday evening. If your name is called and you aren't at the ceremony, you forfeit the award. *There are no excuses for missing the Special Awards ceremony.*

Juniors and seniors may interview for **scholarship and trip awards**. See the state booklet for more information on interview location and time. **These students should bring their high school transcript and a letter of recommendation to the state meeting to use at the interview.**

Technicians

Technicians will need a watch to use for timing and a pen or pencil.

There is a mandatory **technician meeting** Sunday evening. Check the state booklet for time and place. It is imperative that all technicians attend.

Sponsors and Chaperones

A sponsor or a designated **school representative must attend the state meeting** with the students and be available at all times to supervise your students.

Sponsors are to pick up their **judging packets** on the second floor of Findlay/Johnston Commons. All sponsors will be assigned to judge.

All chaperones will be **assigned to supervise** in areas such as the natatorium, gymnasium, auditorium and dance. Chaperoneing packets will be already in your registration packet. All chaperones must report to their assigned area. Please be on time.

Advanced Placement Examinations

PJAS does not make arrangements for the AP exams. PJAS will provide van transportation to the testing site and move your presentation time if necessary for you to take the exam.

Expectations of a Technician at the State Meeting

Copy and distribute to every student attending the state meeting as a technician.

1. All students serving as technicians will report to the *mandatory* Technicians' Meeting on Sunday night to pick up their assignment. The time and location will be in the Program Booklet.
2. All students will go to the Technicians' room Monday at their assigned time.
3. All technicians will bring a watch, a pen or pencil, and be dressed neatly.
4. Any changes in your assignment will be announced at the Monday meeting.
5. Write down the telephone number for the information desk. This is where you will call in case there is a problem.
6. You will note the various times on the technician's score sheet. Mark the beginning time, the time at five minutes to go, at two minutes to go and when they stop. If you have a speech of say 6 minutes, leave the two minutes to go column empty and fill in the ending time in the conclude and stop column.
7. If the student exceeds their time limit or the judges exceed their time limit, please place a * in front of the participant's number.
8. Sign your sheet and have the judges sign the bottom of the sheet also.
9. Return the timing sheet AND any other equipment that was given to you to the Technicians' room at the end of the session.
10. Be sure to find your room on Sunday night so that you won't be late on Monday. You must be in your room at least 10 MINUTES BEFORE the start of the session.
11. Students listed as day-only packages may not serve as technicians at the state meeting.
12. If you fail to do your assigned duties as a Technician at the State Meeting you will not be permitted to attend next year's State Meeting even if you receive a First Award at the Region Meeting.

Pennsylvania Junior Academy of Science

Student Behavior Code

Copy and distribute to all adults and students attending the State Meeting.

Students, Parents, Sponsors, and School Districts are reminded that the behavior code of the student's home school district is in effect during the student's participation in both Region and State PJAS activities. It is expected that sponsors and school districts will discipline the student according to that district's policy if the student violates the behavior code while at the PJAS activity.

Students will be sent home immediately from the PJAS state meeting at Penn State University for the following behaviors:

1. Refusing to follow PJAS State Meeting rules.
2. Acts of vandalism
3. Fighting
4. Theft
5. Possession of weapons, drugs, explosives, tobacco, or alcohol
6. Males in female dorms
7. Females in male dorms
8. Participation in any intimate activity.
9. Involvement in any behavior that threatens the health and safety of the participant or other participants.
10. Involvement in any activity that results in police intervention.
11. Any activity that the sponsor and/or chaperone finds to be a violation of the school district's behavior code.

The student's future participation in PJAS Region and State meetings will be affected by their behavior. Continued participation will be determined by the student's region, sponsor, and school and may include the following:

1. A student sent home automatically forfeits any award or scholarship for which he/she may have been eligible.
2. The student may be required to bring a parent as a chaperone while staying on campus.
3. The student may be required to stay off campus with a parent as a chaperone.
4. The student may not be permitted to participate in the PJAS State meeting for one or more years.
5. The student may not be permitted to participate in both PJAS region and state meetings for one or more years.
6. The student may not be permitted to participate in any PJAS activities the remainder of their middle school and high school careers.

Pennsylvania Junior Academy of Science Safety Committee

Committee Members

Laura Fisanick, James Maloy, Pete Carando, Chriss Schultz

Purpose:

The purpose of the PJAS Safety Committee is to promote a safe environment for each student, sponsor, director, chaperone and adult.

Objectives:

The PJAS Safety Committee has three major objectives.

1. Promptly review all safety related incidents, injuries, and accidents
2. Monitor accident/incident trends and plan prevention
3. Annually evaluate the PJAS safety program and recommend improvements

Committee Meetings;

Meeting schedule

Biannual meetings that coincide with the PJAS State Director's meetings.

Policies:

1. The Pennsylvania Junior Academy of Science (PJAS) will follow the Penn State University policy AD39.
2. The duties of the PJAS state director, region directors, sponsors, chaperonees, and students are listed below:

State Director:

1. Compile and review all early departure reports.
2. Provide the Penn State planner with the reports.

Region Directors.

1. Disseminate fire and natural disaster procedures to all sponsors, chaperonees, and students. PSU housing will provide the fire drill protocol for each dorm.
2. Disseminate **Student Early Departure Policy**.

Sponsors:

1. Review phone numbers of nurse, police, and information desk. Additionally, provide the sponsor's and regional director's cell numbers to students under their supervision.
2. Disseminate fire and natural disaster procedures to all chaperonees and students under their supervision. PJAS sponsors will designate a specific emergency meeting area for their students.
3. Review **Student Early Departure Policy and/or Emergency Transport**.

- a. Prior to transporting students, the adults listed on the PJAS student health form must show a photo ID to the personnel at the nurse's office and/or housing desk.
- b. Students who are leaving prior to the end of the meeting must complete a **PJAS Early Departure Notice** at the housing desk.
- c. Injured or student must report to the PJAS nurse's office. If deemed necessary, the student will be transported to the hospital by designated PJAS personnel.
- d. Injured or sick students, who are not able to report to the nurse's office, must call the nurse's office and a nurse will come to the location of the student. If deemed necessary, the student will be transported to the hospital by designated PJAS personnel.
- e. If a student must be transported by someone other than a designated PJAS personnel, that adult must be listed on the PJAS student health form and must complete the **PJAS Medical Transport Notice** provided at the nurse's office.

Chaperones:

1. All PJAS chaperones must report to assigned duties.
2. Chaperones are responsible for adequate supervision of minors not limited to but including general safety, order, and proper decorum.

Students:

1. All students must follow the guidelines as stated in the **PJAS Student Behavior Code**. Violation of the code will result in student dismissal from the PJAS State Meeting.