

DRAFT – 28 September 2008
REQUIREMENTS AND GUIDELINES
FOR PROFESSIONAL CONDUCT

The United States Association for Young Physicists Tournaments, Inc.

A NOT-FOR-PROFIT CORPORATION
Incorporated in the State of New York

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Section 1. Requirements. The USAYPT establishes these specific requirements for members who participate in a US Invitational Young Physicist Tournament (USIYPT) Team Selection and Preparation at their schools:

a. **Application.** The USIYPT Application will contain a statement that must be signed by the supervisory teacher, student, and parents or guardians attesting that they have read this document and agree to follow both the specifics and intent of this document.

b. **Presentation.** Each problem solution presentation used in competition at the USIYPT must have:

(1) **Names.** A text box on the Title Slide (first slide) that identifies the student team members by name and the team's supervisory teacher(s) by name as *the collaborating group* (see below) who prepared and coauthored the work presented and an additional text box on the Title Slide (first slide) that identifies the student member by name who is presenting the solution.

(2) **Acknowledgements.** The student team members and supervisory teacher(s) are responsible for acknowledging the work of others that is neither common knowledge nor editing review by using properly formatted footnotes on the presentation slides where the acknowledged work is used. American Institute of Physics format standards¹ or Modern Language Association standards² are preferred. Bibliography lists may be used at the discretion of the supervisory teacher(s), although they are not generally used in normal scientific research reports. General acknowledgement statements of financial, equipment, or other support should be made on the final slide in recognition of all who made the school's participation at the USIYPT possible.

¹ *AIP Style Manual* 4th Edition, 1990 <<http://www.aip.org/pubservs/style/4thed/toc.html>>

² *MLA Formatting and Style Guide* <<http://owl.english.purdue.edu/owl/resource/557/01/>>

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Section 2. Explanatory Introduction to the Requirements. This document supplements and adapts the philosophies, implied tasks, specific directives, and guidelines identified below for use in the USAYPT.

a. The USAYPT was organized³:

1. to promote the International Young Physicists Tournament research methodology for high school students and teachers across the United States of America (USA).

2. as authorized by the International Organizing Committee of the IYPT, to supervise the selection and preparation of the five-member USAYPT International Team of secondary school students that will represent the United States at the International Young Physicists' Tournament each summer.

b. A Young Physicists Tournament (YPT), whether at the national level in support of Paragraph 1 above or at the international level in support of Paragraph 2, will be a wonderful and rewarding educational experience for teachers and students alike if they carefully exercise all of the parts of the science research process as they are outlined in this document. One of the aspects of the science research process is competition. One of the aspects of YPTs is competition. Healthy, professional competition in either actual science research or a YPT is performed within a code of ethics that protects individuals and institutions, and preserves the credibility of science.

c. Science is the systematic enterprise of gathering knowledge about the universe and organizing and condensing that knowledge into testable laws and theories. The success and credibility of science are anchored in the willingness of scientists to adhere to the following two principles that provide a mechanism for self-correction.⁴

1. **Open Exchange.** Scientists must be willing to expose their ideas and results to independent testing and replication by others. This requires the open exchange of data, procedures and materials.

2. **New Conclusions.** Scientists must be willing to modify previously accepted conclusions when confronted with more complete or reliable experimental or observation evidence.

d. The American Physical Society (APS) has established standards of ethical behavior relating to the physics profession and promulgates these as the APS Guidelines for Professional Conduct.⁵

1. **Individual and Collective Responsibility:** Physicists have an individual and a collective responsibility to ensure that there is no compromise with these guidelines.

³ "Article I, Section 2. Purpose. By-Laws of the United States Association for Young Physicists Tournaments" adopted by the Board of Directors of the USAYPT 28 May 2007 <http://www.usaypt.org/organizational_documents/By_Laws>

⁴ "Ethics and Values Education Statement 99.6 What is Science?" adopted by the Council of the American Physical Society 14 Nov 99 <http://www.aps.org/statements/99_6.cfm>

⁵ "Ethics and Values Education Statement 02.2 APS Guidelines for Professional Conduct" adopted by the Council of the American Physical Society 3 Nov 1991, updated 10 Nov 2002 <http://www.aps.org/statements/02_2.cfm#supplementary_guidelines3>

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2. **Research Results:** The results of research should be recorded and maintained in a form that allows analysis and review by others.

3. **Manipulation of Data:** Fabrication of data or selective reporting of data with the intent to mislead or deceive is an egregious departure from the expected norms of scientific conduct, as is the theft of data or research results from others.

4. **Publication and Authorship Practices:** Authorship should be limited to those who have made a significant contribution to the concept, design, execution, or interpretation of the research study. Plagiarism constitutes unethical scientific behavior and is never acceptable. Proper acknowledgement of the work of others used in a research project must always be given. Further, it is the obligation of each author to provide prompt retraction or corrections of errors in published works.

5. **Peer Review:** Peer review provides advice concerning research proposals, the publication of research results and career advancement of colleagues. Privileged information or ideas that are obtained through peer review must be kept confidential and not used for competitive gain.

6. **Conflict of Interest:** There are many professional activities of physicists that have the potential for a conflict of interest. When objectivity and effectiveness cannot be maintained, the activity should be avoided or discontinued. It is not unethical to be wrong, provided that errors are promptly acknowledged and corrected when they are detected.

Section 3. Unique Features of a Young Physicists Tournament. A Young Physicists Tournament (YPT) is similar to but not exactly the same as science research or a graded school project. A YPT is a combination of both; therefore, we identify here unique features before adapting the principles of Section 2 to the USAYPT activities.

a. **Take-Home vs. In-Class Exams:** A YPT is not an "in class exam" where only the exam supervisors and proctors know the questions and the grading solutions in advance. There are physics competitions where this is the case, such as the International Physics Olympiad⁶. The Olympiad is an individual competition and is based on closed book, individual exams with grading rubrics developed specifically for each problem. The USIYPT is a "take home team competition." Everyone involved, not just the competitors, know the problem statements and these are known for months in advance. Because YPTs are "take-home exams", there must be a clear understanding of what authorized references and resources are permitted and which ethical standards for each teacher-student team are demanded.

Volunteering to be a supervisory teacher in the USAYPT is more than just chaperoning students on an educational trip. Although students do all of the competitive "performances" in YPTs, few if any students can prepare adequately for these performances without a professional mentor. Almost any mentor will learn as much if not more than the students. The supervisory teachers compete in the Tournaments with and through their students. As such, the teachers must be clear on the various roles they play in the process.

⁶ See < <http://www.jyu.fi/iph/>> and < <http://www.aapt.org/Contests/olympiad.cfm>>

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c. **Group vs. Individual.** Similar to present practices in science research, entering and participating in a YPT is done as a group, not as an individual. That group consists of at least one supervisory teacher and a team of at least two and not more than four students. At least one supervisory teacher and all of the students must be from the same school. One of the two permitted supervisory teachers may be a professional associated with a secondary school but who is not a full time faculty member.

d. **Subjective Grading:** YPT problems are deliberately open-ended to provide an opportunity for each teacher-student team to provide as complete and thorough an investigation into the problem as possible. The YPT is graded with subjective grading rubrics that are available to all competitors before the competition. There are no "approved solutions" known in advance to the competitors or the jurors. Teams are challenged to present their solution in an open competition that mimics the peer review process.

e. **Inter Group Communications.** The teacher-student group at each school from which that school's competition team is selected may be tempted throughout their year of preparation and study to do what real research groups do, namely discuss intermediate results as they attempt to achieve the common goal of pushing back the edges of scientific knowledge. As the APS quotation in Section 2 says, "This [science] requires the open exchange of data, procedures, and materials." There will have to be some artificial boundaries to this process that is unique to the USIYPT competition and not generally applicable in the worldwide science research community.

f. **Educational Goals.** None of these aspects of YPTs are bad. YPTs allow students and teachers to demonstrate the

- 1) ability to apply knowledge of mathematics, science, and engineering;
- 2) ability to design and conduct experiments as well as analyze and interpret data;
- 3) ability to function in a collaborative group and communicate effectively; and the
- d) ability to act in professional and ethical modes of behavior.

All of these outcomes are desirable outcomes for science education in the 21st century⁷.

Section 4. Adaptation of Ethical Guidelines to the USAYPT US Invitational Young Physicists Tournament. Participation in the USIYPT each year places a school team(s) in competition with the other participating schools' teams from across the US and in some cases around the world. The problem statements for that USIYPT one year away are announced at the end of the present USIYPT and on the USAYPT website (www.usaypt.org) as soon as possible after they are approved by the Board of Directors, of the USAYPT.

⁷ *Course Description Physics B, Physics C*, CEEB Pamphlet, 2002-2003. p. 3-9, 16-25; *Taking the SAT II: Subject Tests*, CEEB Pamphlet, 2002-2003. p. 34; D. Rosdil "What are our majors doing?" AIP Statistics Division, Pub. No. R-398.1, Sept 1996; "Shaping the Future: New Expectations for Undergraduate Education in Science, Math, Engineering, and Technology" NSF Division of Education and Human Resources 1996; A.P Carnevale, L. J. Gainer and A. S. Melzer *Workplace Basics: The Essential Skills Employers Want* (Jossey-Bass, San Francisco) 1990; to name a few.

a. Team Member Selection. A school team planning on participating in an USIYPT should be selected by local procedures as soon as possible to permit adequate preparation. Some schools use extracurricular clubs to sponsor their USIYPT team. Some schools use students enrolled in formal "research" classes. Some schools have many more students than three, the maximum number of student team members. Some schools will have only two participating students, the minimum number of student team members. The local procedures used to select the school's USIYPT team members are decided by the local supervisory teacher(s). Each USAYPT member is permitted to sponsor and supervise one⁸ USIYPT team. Two USAYPT members may co-sponsor and supervise one USIYPT team together. If two or more USAYPT members decide to sponsor one team each at the same school, those teams are in competition throughout the year and not free to collaborate.

The requirement to sponsor only one group is based on experience and represents an attempt to protect a teacher from possible conflicts of interest. It is nearly impossible for one teacher to properly supervise two different groups in their independent development of the solutions to the problems. Permitting multiple groups at one school to collaborate outside their group represents an unfair advantage for a school with a large YPT program versus a school with a small YPT program. The temptation to share solutions and therefore copy work among multiple teams at a single school is an unnecessary burden for young researchers, students or teachers. Bad science gets propagated when supposed solutions are copied and not verified. If schools have two USAYPT members and develop two separate USIYPT teams, those teams must be developed and work independently to avoid having an unfair advantage over the other schools.

b. Collaborating Group: The supervisory teacher(s) and his or her student research group members form a "collaborating group" (this group may be larger than the number of eventual team members as noted above). We define a "collaborating group" to be equivalent to those research groups who author a scientific report under accepted scientific research ethical standards. Following the second APS minimal standard above: "Authorship should be limited to those who have made a significant contribution to the concept, design, execution, or interpretation of the research study."

c. Collaborative Authorship: Each teacher-student group is responsible for all of the team's solutions collectively under the intent and spirit of the APS Supplemental Guideline on the Responsibilities of Coauthors and Collaborators⁹, which includes the following:

(1) All collaborators share some degree of responsibility for any paper they coauthor. Some authors have responsibility for the entire paper as an accurate, verifiable, report of the research.

(2) Coauthors who make specific, limited, contributions to a paper are responsible for them, but may have limited responsibility for other results.

(3) While not all coauthors may be familiar with all aspects of the research presented in their paper, all collaborations should have in place an appropriate process for reviewing and ensuring the accuracy and validity of the reported results, and all coauthors should be aware of this process.

⁸ USAYPT Regulations and Forms for the US Invitational Young Physicists Tournament, approved 8 Feb 2008
<http://www.usaypt.org/organizational_documents/USIYPT_Regulations_and_Forms>

⁹ "Ethics and Values Education Statement 02.2 APS Guidelines for Professional Conduct" adopted by the Council of the American Physical Society 3 Nov 1991, updated and expanded 10 Nov 2002
<http://www.aps.org/statements/02_2.cfm#supplementary_guidelines3>

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(4) Every coauthor should have the opportunity to review the manuscript before its submission.

The implementation of these "collaborative author" provisions is a natural part of the preparation of a USIYPT Team. The supervisory teacher(s) are responsible for the team's preparation. The collaboration is forced in the sense that student members must learn each other's problems at least to the minimal level that they can claim collaborative authorship. We define the minimal level of collaborative authorship is that of critique in rehearsal. This usually comes about during training and rehearsal sessions at the home school (as well as on site at the USIYPT) when students rehearse to each other and the teacher(s). It is important to recognize that each student and supervisory teacher bears the responsibility to act as a member of a collaborating group critiquing the work of their colleagues and being prepared to present and defend the work if necessary. The USAYPT has established the specific requirements stated in Section 1 above as a means of achieving the educational and ethical goals set forth in this Section.

The supervisory teacher(s) bears primary responsibility for meeting the minimal standard concerning research results and instructing the students of their group and team in accomplishing this task. Fabrication, selective reporting with intent to deceive, and theft of data or another's work is obviously cheating. Teachers are warned that some countries that participate in the IYPT attempt to collect and post "proceedings" with proposed solutions to previous IYPT problems culled from their country's team or other country's teams. Use of these solutions must follow the rules of authorship, plagiarism, and use of other's work as noted many times in this document. It should also be noted that these published solutions are often largely unedited submissions and are not to be trusted.

d. Inter-Group Communications. During the year of preparation for the USIYPT, the competing school groups around the world are *not obligated* to share information about current problems. USAYPT Board Members *are obligated* to provide information, discussion, and support to any USAYPT member seeking the same.

"Initial guidance" on how to start thinking about the problems selected for the USIYPT have been placed in documents referred to as "Guides" and located on the Members Services Webpage. These Guides are meant to help beginning teachers begin the work necessary to start an USIYPT problem. They are for teachers. These Guides can be abused if a teacher simply hands the Guide to the student either in hardcopy or electronically. This abrogates the teaching process and is not permitted. Before a USAYPT member is given access to the Members Services portion of the USAYPT website, they must sign a written statement promising to never show the Guides to a student.

It is possible that a teacher may receive so much information from another source (such as a Guide) and that he or she crosses the line from common pursuit of science to copying the work of another. The guideline for the initial assessment of the difference between sharing and copying has already been mentioned as the second APS minimal standard above: "Authorship should be limited to those who have made a significant contribution to the concept, design, execution, or interpretation of the research study. Plagiarism constitutes unethical scientific behavior and is never acceptable. Proper acknowledgement of the work of others used in a research project must always be given." The final assessment of the difference between sharing and copying is when the sponsored team presents their work at the NYPT and is questioned by the opponent and judged by the jury. Clearly, problem solutions that appear to be largely copied from the works of others will not be graded as

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highly as correct but more original work. The member teacher clearly bears primary responsibility for teaching not copying, and educating his or her sponsored students in these issues.

e. Common Knowledge. We note for beginning researchers that "common knowledge" does not have to be acknowledged nor documented. Physics is fortunate in that the common knowledge of physics is fairly well known. A good rule of thumb is that numbered, basic equations in our introductory textbooks are common knowledge. Another area of assistance that does not have to be acknowledged nor documented is the editing review for typographical, algebraic, or graphical mistakes or errors. This is an expected form of preparation. When the "ideas" of a problem's solution, i.e., the "concept, design, execution, or interpretation of data", come from outside the teacher or the sponsored student and are not common knowledge nor edited review, this must be acknowledged and documented in the presentation at the ITST and the IYPT.

f. Individual Team Member Problem Ownership. Each eventual student member of a USIYPT team usually bears the primary responsibility to the team for the solutions for 1 or perhaps 2 problems and is usually the oral presenter during the USIYPT competition when one of those problems is being played. However, the Team Captain makes the final decisions about presentation during the initial challenge phase of each Physics Fight. The Captain may change who presents for a variety of reasons, such as sickness, technical speaking abilities, emotional issues, tactical decisions of the Fight, possible violations of USIYPT regulations, etc. The USIYPT is a group competition.

Section 5. Reporting and investigating Possible Cases of Professional Misconduct

a. Observation and reporting of a possible case of misconduct must be made in writing to the Tournament Director of the USIYPT as soon as possible. It would clearly be best if the report could be made in time for at least a preliminary investigation to be completed before the tournament during which the alleged incident took place was over.

b. Initial Investigation: The Tournament Director is responsible for an initial investigation and preparation of a written report of the facts to the President of the USAYPT as soon as possible. The Tournament Director's Report will include the initial report that he or she received.

c. Investigation Committee: The President of the USAYPT may appoint an Investigation Committee of two disinterested Board members upon receipt of the Tournament Director's Report. If so appointed, the Committee will investigate the incident as soon as possible. The USAYPT Board of Directors will meet to consider the final adjudication of the incident after all reports have been completed. Members of the Board who may be involved in the incident must recuse themselves under conflict of interest. Majority vote of the remaining members will determine the outcome of the incident.