

PROPOSAL
World Year of Physics 2005
Physics Talent Search

GOAL. The goal or purpose of the WYP 2005 Physics Talent Search is to create enthusiasm, interest, and participation in physics among young people (and their families).

PROCESS. Participating countries will identify physics-talented girls and boys. Countries will establish their own selection process, consistent with the criteria set forth below. A sufficient number of countries have chosen to participate, to merit endorsement of the Physics Talent Search as an international or global activity of WYP2005.

Each participating country will form a WYP 2005 Physics Talent Search National Committee, which will be responsible for designing, publicizing, and executing the program in the country, and whose identification of physics-talented young people will be final.

GUIDELINES FOR IDENTIFICATION PROCESS AND CRITERIA.

1. The nomination process should be open to all, allowing the consideration of young people nominated by schools, teachers, parents, self-nominations, and others.
2. The selection process should celebrate and recognize the talent and interest of everyone who participates. We are not trying to create losers, who could feel excluded or untalented, and may decide that physics is not for them.
3. Males and females must be selected for international recognition in equal numbers by all participating countries.
4. Selected young people should be in the age range between 10 and 18, inclusive. Countries may choose to focus on a narrower age range within these limits. Sub-ranges of 10-12, 13-15, and 16-18 may be used, with talented young people (boys and girls in equal numbers) selected in each subrange. Full-time college or university students are not eligible: the talent search is focused on identifying young people before they become full-time students at a university/college. (A student taking some university-level courses while enrolled full time in high school, gymnasium or the country's equivalent would be eligible.)
5. Selection criteria require interested students to do several of a large set of possible activities. In such a selection process, all students completing the requisite number of different activities would be identified as physics talents in the country, receiving a national certificate and any other awards arranged by the National Committee. This process would be like earning a merit-badge or collecting visas on a passport. The International Committee discourages the use of an examination or test, leading to the selection of the highest scorers. Activities that result in the participants learning

something through their participation are preferred more than activities that have the participants regurgitate what they know.

6. The National Committee must establish a time limit for the young people to perform the activities. The recommended time limit is 6 months (minimum is 4 months and maximum is 9 months). It is recommended that national committees conduct the talent search between specific dates (such as 1 January 2005 to 30 June 2005).

7. Every participating country will submit for international recognition the names of at least one male and one female student in each age category the country chooses to use. Countries with a large population and many students participating in the Talent Search are allowed to nominate additional students for international recognition. Up to one additional pair (girl and boy) of students may be submitted for international recognition in each age category for each 5 million persons in the country's population. However, no more than 20 girls and 20 boys may be submitted in each age category from any country. Remember the same number of girls and boys must be submitted in each age category. Countries may submit one number of students in one age category and a different number in a different age category. For international recognition, the names of the identified young people must be submitted by their National Committees to the International Committee not later than 15 September 2005.

8. National Committees are encouraged to create a web page to publicize the Talent Search and to put the contributions and achievements of participating students on display. National Committees are also encouraged to use newspapers, radio, teachers, schools, science museums, and the national physical society to publicize the Talent Search, the participants, and the students submitted for international recognition.

9. National Committees will set the menu of tasks students may perform to earn points. Tasks are assigned a different number of points, depending on how difficult or time-consuming they are. Students will be required to perform a sufficient number of these tasks to accumulate at least 10 points from at least three categories for National Recognition, as "[Country Name] WYP 2005 Physics Talent." To be eligible to be submitted for International Recognition, students must perform activities in at least four categories, and accumulate at least as many points as their age in years. Any student achieving this level will receive a certificate identifying him/her for "International Honorable Mention in the WYP 2005 Physics Talent Search." Among this group, National Committees will select specific male and female students (see #7, above) to be submitted for International Recognition as "International WYP 2005 Physics Young Ambassadors."

National Committees will prepare and publicize the list of tasks or activities participating students must or choose among and perform. The International Committee recommends that National Committees include the following types of tasks and point structure. National Committees are free to add additional types of activities (see category i), and to delete or modify activities if necessary to make the Talent Search more meaningful in their countries. Students can do as many tasks as they like, earning as many points as

they like. The limits on the number of points from each category only apply to the points, required for international honorable mention and eligibility. Students who choose to acquire more than 15 points may do different tasks in different categories or multiple tasks in one category. To earn multiple points in one category, the tasks MUST be distinctly different from each other in content (e.g. two experiments or two essays must be on entirely different topics, not just slight variations of each other). The National Committee is the sole judge of the acceptability of tasks and the earning of points. Written work will be accepted if it is in an official language of the country or in English.

10. The menu of categories, activities, and points.

a. Writing about physics (not more than 3 points from this category are allowed among the minimum number of points to qualify for International Recognition).

- (1 Point each) Write an essay on a physics topic, such as "Why I am Interested In Physics," "How Physics is Important in My Community," "Predicting The Physics Frontier in 2105," "The Physics Question I am Most Interested In," "The Most Exciting Physics Discovery of the 20th Century," "A Great Moment in the History of Physics," or "How Physics is Important in My Life." National Committees may choose physics-related topics that might be particularly relevant in the country. National Committees should designate the list of topics students can choose from.
- (1 Point each) Write a poem, haiku, short story, or limerick related to physics.
- (1 Point each) Write about an experience or activity the student participated in, and how it involved or demonstrated physics.
- (2 Points each) Write and perform a play about physics or physicists.
- (Up to 2 Points) Interview a physicist (in person, telephone, web, or by mail) and write an article about the physicist (1 Point) and share the information at school. The physicist interviewed may not be a close relative (parent, sibling, uncle, aunt, nephew, niece, or grandparent) of the student. Publish this article in a newspaper or magazine or share it with many people in some other way used in the country (1 additional point).

b. Physics Experiments (At least 2 points must be earned in this category for International Recognition. Not more than 7 points from this category are allowed among the minimum number of points for International Recognition. Up to two distinctly different experiments can be counted in the first 15 points).

- (3 or 4 points each) Design a novel experiment that uses physics or advances physics and write a description of the experiment, including a hypothesis about the result (3 points). Include a description of the relevant theories (1 additional point).
- (2 or 3 points each). Perform and prepare a write-up of a physics experiment designed by the National Committee (2 points). Include a description of the relevant theories in the write-up (1 additional point). [The National Committee should identify different experiments for each age group included in the country's talent search.]

- (4 or 5 points each) Design, perform and prepare a write-up of a novel physics experiment invented by the student (4 points). Include a description of the relevant theories in the write-up (1 additional point).

c. Physics and Art (Not more than 3 points from this category are allowed among the minimum number of points for International Recognition)

- (1 point each) Design and create a poster to excite the public or other students about physics.
- (1 point each) Design and create a poster to inform the public or other students about an important physics law, principle, or discovery.
- (1 point each) Design a physics-based postage stamp.
- (1 point each) Create a sculpture, drawing, or painting that exemplifies or demonstrates a physics principle.
- (1 point) Use music to demonstrate a physics concept
- (2 points) Compose and perform an original piece of music around a physics-related theme.

d. Physics and photography (not more than 4 points from this category are allowed among the minimum number of points for International Recognition).

- (2 points each) Take a photo that has significant physics interest and write a brief description that explains its physics
- (2 points each) Make a short video that has significant physics interest or value and narrate it with explanations.

e. WYP 2005 Activities (not more than 3 points from this category are allowed among the minimum number of points for International Recognition).

- (1 point for each activity participated in) Participate in one or more WYP2005 activities, such as "light around the world" or the Physics Story Project,
- (1 point for each) Attend a WYP2005 public lecture, physics event, or museum exhibit.
- Sorry, no points are awarded for entering the WYP Physics Talent Search (this activity).
- (2 points) Help organize a WYP 2005 activity in your country and participate in it.

f. Teaching physics (not more than 4 points from this category are allowed among the minimum number of points for International Recognition).

- (2 points each) Design and write up an activity for younger children that would teach them some physics and could be done in the country's schools. Indicate what age or grade the activity is for. Include instructions for teachers in the write-up. Do the activity with a class of students of the appropriate age (2 additional points), and modify it, if needed, based on your instructional experience.
- (1 point each) Write a physics article or story that explains to younger children a physics law, principle, or discovery. Indicate what age or grade the article is for.

g. Physics Competitions (Not more than 2 points from this category are allowed among the minimum number of points for International Recognition). Note that in this category, points are earned for entering and participating, not for winning or being selected for a national team.

- (1 point) Enter the country's competition to select its Physics Olympiad Team.
- (1 point) Enter a physics project in a science fair competition.
- (1 point) Enter another national, regional, local, or international competition related to physics OR make a physics-related entry in a science-focused or general academic competition.

h. Physics literature search and research paper (Not more than 2 points from this category are allowed among the minimum number of points for International Recognition).

- (2 points for each topic). Research a physics topic using original physics research papers. Write a paper that summarizes the research, tells why it is important, and identifies at least two questions that remain to be answered in this research area. The research area could be experimental, theoretical, computational or any combination thereof. List the original research papers in a bibliography.

i. Other activities or tasks designed by the National Committee (Not more than 2 points from this category are allowed among the minimum number of points for International Recognition).

- The National Committee must specify the eligible tasks/activities and the point value for each.

11. National Committees will need to specify what evidence must be included in the nomination to prove that tasks were completed. It is recommended that the National Committee request copies or originals of stories, poems, articles, photos, essays, write-ups, posters, etc be submitted for use/display by the National Committee. National Committees are the sole judge of the adequacy of the tasks and the earning of points.

12. National Committees will need to specify how they will select the young people whose names will be forwarded for international recognition from among those who qualify. To be eligible for international recognition, students must complete at least as many points worth of activities as their age in years, in at least four categories. [For example, 13-year-old boy or girl would need to earn 13 or more points from four categories; an 18-year-old would need to earn 18 or more points from four categories.] If many students participate and earn the required number of points, one criterion the National Committee should use to select those few girls and boys (in equal numbers) designated to become "International WYP2005 Physics Young Ambassadors" is the total number of points earned and the total number of categories they were earned in.

RECOGNITION AND REWARD

1. Every student who earns a sufficient number of points for National or International Recognition will be recognized/rewarded with a certificate, as a minimum. National-

Level award certificates should be given to every student who successfully completes at least 10 points worth of activities. International-Level Honorable Mention certificates will be given to every student who successfully completes a number of points equal to or exceeding his or her age. The International Committee will prepare an international-level honorable mention certificate form and email it to the chairperson of the National Committee. The National Committee will be responsible for providing personalized certificates (with the student's name printed on it) to each student in its country qualifying for this award. A list of the names, schools, and towns of each student achieving international honorable mention should be emailed to the International Committee Chairperson. A separate list of the names, schools, and contact information for the male and female students selected to become "International WYP2005 Physics Young Ambassadors" must be emailed to the International Committee Chairperson, not later than 15 September 2005.

2. The National Committee will determine what additional rewards and recognition will be provided to its country's physics talents. Possibilities include: meeting with a physicist, a visit from a member of the National Committee to present the award certificate, an award ceremony where several physics talents are honored, a congratulatory letter from a physicist, a mentoring relationship with a physicist, invitations to physics events or a physics camp, and other 'prizes'.

3. For the young people submitted from each country for International recognition as "International WYP 2005 Physics Young Ambassadors," the WYP 2005 organizers and Talent Search International Committee will provide a certificate, a letter from some important physicist, and some visibility (web page, press release) for the International Physics Talents. The International Committee will seek sponsorship for additional prizes, which could include travel to an awards ceremony and/or an invitation to visit to an international physics research center. The International Committee will also seek to an international Physics Young Ambassador web event associated with the WYP2005 Conference in Durban, South Africa, to allow the identified students to participate either in person or virtually, through the web. Countries should make every effort to provide each of their "International WYP Physics Young Ambassadors" with a physicist who speaks the student's native language to be a mentor for him or her, at least through the completion of the school years.

TIPS FOR SETTING UP A NATIONAL COMMITTEE FOR THE WYP 2005 TALENT SEARCH

1. Each country planning to participate in WYP 2005 Talent Search must declare this intent to the International Organizing committee, and establish a National Committee. The country must designate a Talent Search chairperson, who chairs the National Committee. The chairperson is the primary point of contact to the International Committee. Each National Committee should include at least three members. To find additional members for the National Committee, one can contact the country's physical society, national teacher organizations, appropriate government offices, physics funding

sources, science museums, committees organizing the national physics olympiad teams, and businesses that employ physicists or sponsor youth-oriented science activities. It is very helpful to include on the organizing committee men and women, educators and researchers, people from the major ethnic/religious groups in the country, and people who can help with fundraising and communication.

2. The National Committee should be in close communication with the committee organizing WYP 2005 in the country. The name of the talent search chairperson should be sent as soon as possible to Dr. Beverly Hartline (beverly.hartline@comcast.net), chairperson of the International organizing committee for WYP2005 Talent Search.

3. The National Committee must organize the Talent Search in the country, decide what age group(s) to include, translate and publicize the rules, establish competition deadlines, make sure students throughout the country can learn about the opportunity to participate, receive and review nominations and verify points, and select the individuals to be submitted to the International Committee for International Recognition. The National Committee is also responsible for finding sponsors and prizes and deciding how to award them.

4. The Guidelines for identification process and criteria, above, describe other responsibilities of the National Committee and provide some tips for how to accomplish them.

INTERNATIONAL ORGANIZING COMMITTEE

WYP2005 Talent Search international organizing committee and contact information:

1. Karen Hallberg, Argentina, karen@cab.cnea.gov.ar
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