A Six Step Guide for SOT Regional Chapters Hosting "Paracelsus" Programs for K-12 Teachers

Offered by the SOT Education Subcommittee for K-12 Education

Increasing public understanding of toxicology is a major goal of the Society of Toxicology. Introducing K-12 science teachers to the field of toxicology helps to achieve this, and at the same time offers the teachers new ideas for stimulating student interest in learning science and math and helping them to integrate and apply this knowledge. Public outreach programs specifically for K-12 teachers offered by the SOT have come to be known as "Paracelsus" programs. This Six Step Guide was created to help regional SOT chapters wanting to offer Paracelsus programs for science teachers in their communities.

A detailed "Paracelsus Program Planning Guide," available from the Director of Education at SOT headquarters, has also been developed for SOT members planning K-12 teacher education programs at national SOT annual meetings. Programs offered by regional chapters need not be as large-scale or complex as those offered at annual meetings. Addressing the following questions is fundamental to initiating any Paracelsus program--however large or small.

1. Who is your target audience?

We suggest targeting a specific audience of teachers, especially if this is your first experience with K-12 outreach (e.g., grades K-3, 4–8 or 9-12). An audience of approximately 20 teacher participants is recommended. Number of teachers may also be established by your budget (see Step 5) or number of other SOT members willing to serve as mentors (see Step 6). Key to the success of these programs has been the ability of SOT to help pay for substitutes to allow teachers to be absent from their classrooms to attend these programs.

2. How will you contact them?

Different strategies to locate interested teachers have been used successfully by organizers of Paracelsus programs at national SOT and regional chapter meetings. School district science education coordinators, other school administrators, and teacher professional organizations have been helpful in the past. Some regions have NIEHS outreach centers with whom the SOT chapter can collaborate to identify and recruit teachers. Specific teachers can also be identified and recruited by individual SOT chapter members. The SOT Director of Education can offer a general overview of approaches used in various locations.

In addition, SOT headquarters is maintaining a database of teachers and SOT members who have participated in programs offered in the past. The K-12 Education Subcommittee and other SOT members who have organized Paracelsus programs may also be able to help. Consult the SOT Directory for contact information for the following "veteran organizers" of Paracelsus programs: Ann de Peyster (Anaheim 1996 annual meeting); James Klaunig (Cincinnati 1997 annual meeting); Juliane Hill (1998 annual SOT meeting); Benny Blaylock (New Orleans 1999 annual meeting); Anna Shvedova (1998 Tenth Anniversary Allegheny-Erie Regional Chapter Meeting); Elaine Knight (Philadelphia 2000 annual meeting) and Regina Donahoe, Susan Kradle (San Francisco 2001 annual meeting).

3. What will your program involve?

Chapters may wish to invite teachers to their regional chapter scientific meetings or other activities (e.g., tour of a local toxicology laboratory) and this is encouraged. Attendance will be highest if programs are not offered during the busiest times of the school year (e.g., first few weeks, periods before standardized test dates, science fairs, final exams, etc). An appropriate balance between scientific presentations (including coverage of subjects like "the dose makes the poison", the value of the science of toxicology in risk assessment, why toxicologists must use animals, etc.), teacher- and classroom-oriented activities, and an opportunity to interact one-on-one with toxicologists has always been successful. A basic schedule for a 1-day program is shown here. The morning sessions typically consist of lectures and hands-on demonstrations, a least some of them targeted specifically for K-12 teachers. Examples of specific programs offered to-date are available from the SOT Director of Education.

Toxicology concepts and teaching tool presentations (9:00 am to 11:30 am)
Lunch with toxicologist mentors (11:30 to 1:00)
Participant discussion (1:00 to 2:00)
Poster viewing session with mentors (2:00 to 3:00)
Social hour (3:00 to 4:00)

4. What classroom activities will you present?

Teachers will appreciate programs that give them teaching materials to help them do their jobs better, especially those that can be taken right back into the classroom with little or no adaptation. You may already have some great ideas; however, if you need some assistance with this, suggested resource people include the Director of Education at SOT headquarters, members of the K-12 education subcommittee, members of your chapter who have been active in K-12 education, and NIEHS centers with K-12 outreach programs (consult their web sites through www.niehs.nih.gov).

Teachers with some experience with the subject matter (i.e., those who have previously participated in an SOT or NIEHS K-12 workshop) could be asked to present a session. If your attendees are K-3 teachers, "hands on" material is most appropriate. If your attendees are grades 9-12 teachers, information regarding a historical perspective of toxicology, more sophisticated laboratory experiments, current issues or career opportunities would be welcome.

5. How will you fund it?

Contact the Director of Education at SOT headquarters for current information on availability of SOT funds for K-12 programs offered by regional chapters. Expect to be asked to provide a brief proposal addressing as many of the questions indicated in this Six Step Guide as you can. Attach a proposed budget, including how many teachers you expect to have. The majority of funds approved for these programs in the past has been used to cover the cost of substitutes to enable the teachers to be absent from the classroom to attend our SOT programs during the weekday. Evidence of intent to try to supplement your program funding needs with in-kind or other local support (for example, lunch or refreshments provided by a local industry or other program that also supports K-12 outreach) will be viewed favorably, but is not a prerequisite for support for these activities from SOT headquarters.

6. How can you involve your chapter members?

These programs always require some extra effort by chapter members who are committed to enhancing K-12 science education. Chapter members typically play one of two roles:

Mentors: Evaluations by teachers of every SOT program offered thus far have noted that one of the most beneficial and memorable activities at these programs has been time teachers have spent interacting one-on-one with toxicologists. We strongly urge you identify a suitable chapter member to serve as a mentor for every one or two teachers at your program and allow sufficient time for a meaningful contact to be made. This is such an important element of these programs in terms of long-term success and sustainability of K-12 efforts that the K-12 subcommittee is developing specific materials to help SOT members to be effective K-12 mentors for K-12 teachers and students.

Organizational helpers: How many people are needed to offer a successful program obviously depends on how complex your program will be. One person may be able to organize a regional chapter K-12 teacher program with very little assistance but we strongly discourage this! This is an ideal way for others in the chapter to become involved in a worthwhile chapter activity. Although one responsible person needs to be fully committed to coordinating the effort, we suggest that important activities can be handled by other capable chapter members. Division of labor might be (1) development of program content, (2) teacher recruitment and registration, and (3) mentor recruitment and orientation/training.

Good organization is important. If you have planned your program thoughtfully and carefully, then your efforts will be rewarded by the enthusiasm and appreciation of the teachers you involve in your chapter activities!

Shown on reverse are comments from past programs to help plan your program. Do not hesitate to call SOT headquarters for further advice and encouragement!

Comments from teachers --

"The day was great" - "Great idea" - "Fantastic" - "Excellent" - "Everything was interesting and beneficial" ..."most science teachers long for career/technology related conferences desiring to make classes more applicable"..."thanks 10^{6}"

"Certainly appreciate the recognition of our situation and your professional support"..."enjoyed being treated like a scientist again" (former plant pathologist)

"Please make program available to teachers next year!...I teach AP Chem and will encourage students to look into a career in Toxicology"

"It was good to get a sense of types of investigations that are going on in the real world...How big the field of toxicology is!"

"Many excellent ideas for research projects.... Please add more ideas/activities for the classroom! This is just a beginning!"

"Meeting people and networking was great. I got lots of connections for class materials in subjects which are unusual for high school curriculum, but very relevant! Great workshop. Salt taste test will be done in my class (perhaps this was the teacher who won the SEPUP kit in the drawing we held??)"

"More teacher presenters" "share [more] teacher experiences in integrating toxicology topics in classrooms" (A "teachers-training-teachers" approach would be ideal, if enough high school teachers can be found--or further educated--to have sufficient knowledge of toxicology.)

"Lab applications for lower level kids" (In this case, lower level could apply to either freshman/ sophomore or non- superstar/advanced placement students.)

"Might consider a 'lab workshop' with labs that could be used in biology and/or chemistry"...want "labs that I walk away with at the end of a session...not on computer for biology at 10th grade level...all study ready to go"---"self-contained kit or educational module package to take with us"--possibly ones that "could be borrowed by schools".

"Identify agencies sponsoring research at the secondary level"..."provide mentor contacts for science fair students"

Suggestions from mentors --

"Provide business cards for mentors who are students so that teachers can contact them easily"

"Provide mentors with background of the teachers in advance, what the teachers will be doing in the Paracelsus program before they meet with mentors, and specific guidance for questions to address so that any time mentors can spend with the teachers does not need to go through this."

"Provide list of ways in which mentors can provide scientific or other support that teachers can actually use and that would be most meaningful."

"Make sure physical environment for discussion is optimal (i.e., seating, noise level, etc.), that the mentor:teacher ratio is workable, and that there is sufficient time to engage in meaningful discussion."

"Make sure teachers know in advance exactly what SOT is, and also that the advance literature mailed to teachers indicates clearly that the K-12 program is part of a meeting..."