



# U.S. National Chemistry Olympiad (USNCO) Coordinator's Handbook

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### **Goals of the USNCO Program**

The ACS views the USNCO program as a means of investing in the future of young chemists. The goals of the Olympiad are:

- to stimulate young people to achieve excellence in chemistry;
- to recognize outstanding chemistry students and, by doing so to encourage additional learning at a formative time in their intellectual development;
- to recognize the excellent achievement of the teachers of these students and the importance of the school environment in which they learn;
- to promote contact between ACS local sections and area schools and to foster the interest and influence of professional chemists in the teaching of chemistry;
- to foster cross-cultural experiences and to acquaint students with similarities and differences between themselves and their counterparts in other nations; and,
- to challenge the chemical knowledge and skills of students in an international arena.

### **Components of the USNCO Program**

The U.S. National Chemistry Olympiad (USNCO) program is a multi-tiered competition sponsored by the American Chemical Society (ACS) since 1984. It consists of the following stages:

- **Local Section Competition** - A competition conducted by the ACS local section with the purpose of encouraging widespread participation and selecting nominees to sit for the National Exam. You have an option of ordering and administering an exam designed by ACS to assist in this selection process, although it is up to the local section's discretion how students are ultimately nominated. Roughly 16,000 students participate in this stage of the USNCO.
- **National Competition** – Each local section can nominate between 10 to 29 students to take part in the National Exam. This exam with three parts that can be administered in any order, and you are free to schedule breaks between parts. The examination includes multiple-choice questions (one-hour, 30 minutes), a free-response section (one-hour and 45 minutes), and a laboratory practical (one-hour and 30 minutes) administered by the ACS local sections. Roughly 1,000 students participate in this stage of the USNCO. The scores from this exam are used to select the students who attend the USNCO study camp.
- **Study Camp** - Twenty students are invited to attend an approximately two-week training camp to prepare them for the international competition. Based on the performance at the study camp, four students are selected to represent the United States at the International Chemistry Olympiad.
- **International Chemistry Olympiad (IChO)** - A ten-day competition held abroad where delegations from more than 80 countries participate. Typically, four students accompanied by two mentors and two scientific observers comprise a national team. The competition consists of a five-hour theoretical exam and a five-hour laboratory practical. Students also participate in cultural exchange activities.

### **Coordinator Requirements**

USNCO Coordinators must be appointed by their ACS local section chair. They must complete a participation form before all necessary deadlines. There is no requirement to be an ACS member.

When agreeing to serve as a Chemistry Olympiad coordinator, you are required to disclose any perceived or real conflicts of interests to the USNCO Subgroup of the ACS Society Committee on Education. Having a paid tutoring arrangement for the Chemistry Olympiad creates a real conflict of interest disqualifying your involvement from coordinating, administering, or preparing the Chemistry Olympiad exams.

### **Student Requirements**

All interested secondary school students (grades 9-12) who can be accommodated by their local section are invited to participate in the local section selections and Local Section Exam (LSE). The LSE may be translated and administered in other languages. All students must register first with ACS in order to participate. Registration link is available on the USNCO website. Participation in the local section selections is how the majority of students interact with the USNCO, so please work to make this an enjoyable and inclusive experience.

The USNCO will consider providing competitors with disabilities with accommodation to enable them to compete within the rules of the USNCO to which all competitors are subject. Accommodations that fundamentally alter the highly competitive nature of the USNCO contest and/or create undue hardship cannot be granted. For example, in nearly all cases time extensions cannot be accommodated for the National Exam because they fundamentally alter the competitive nature of the exam and create an undue hardship on volunteers. Coordinators may grant students extra time for the LSE at their discretion. Students must request accommodation as soon as possible to enable the USNCO to consider the request.

National Exam Nominees must meet the following criteria:

1. Students must be U.S. citizens or legal, permanent residents of the United States (green card holders) to take the U.S. national examination.
2. High school students who will graduate no earlier than spring of a year in which they participate in the competition are eligible.
3. Students must be under the 20 years of age on the first of July of the year of the competition.
4. No more than two students per high school per local section may be nominated to take the national exam. In the case of magnet programs, split enrollment, or cyber students, a student's school is defined as the high school from which the student will receive their diploma.
5. Eligible students who have previously attended the study camp automatically qualify for the national exam and do not count against the limit on the number of eligible students from their local section or school.
6. Winners of gold medals at the International Chemistry Olympiad are not eligible to participate in subsequent National Exams, study camps, or International Chemistry Olympiad competitions.
7. Students who have taken advanced placement courses in chemistry are eligible.



8. A student may participate only in the competition of the section in which the student's high school is located. In the case of a cyber-student, the student shall participate in the local section where they are geographically located, regardless of where the cyber school is located. Cyber schools can nominate no more than two students.
9. A student who participates in the Physics Olympiad study camp, the Mathematics Olympiad study camp, or the Biology Olympiad study camp is not eligible to participate in the Chemistry Olympiad study camp during the same summer
10. Only non-programmable calculators are to be used on the national exam and on the ACS local section exam, if used. The use of a programmable calculator, cell phone, or any other device that can access the internet or make copies or photographs during the exam is grounds for disqualification.

### **Local Section Selections**

***All students must first register with ACS by completing the registration form online in order to participate in the USNCO program. Registration link will be available on the USNCO website and will be sent to USNCO Coordinators. ACS will send lists of all registered students to each USNCO Coordinator and they will confirm that students belong in their Local Section and notify all students.***

The local section may use any method of selecting nominees to take the national exam. Some options to consider (in no particular order) include:

- Accepting teacher recommendations
- Selecting finalists from other chemistry competitions or science fairs
- Locally prepared examinations
- ACS prepared Local Section Exam (LSE)

In choosing a date to hold the local section competition, refer to the USNCO Program Schedule. You may want to avoid ACT/SAT testing dates. Check with area chemistry teachers and the local school calendar before selecting a date to avoid other local conflicts (other competitions, spring break etc.). Avoid scheduling the exam in the last days of testing window if possible to give yourself enough time to inform the students about the results and select your nominees.

#### ***Using the ACS LSE***

The ACS LSE is written every year by the members of the Examinations Task Force. Previous versions of the exam are available at [www.acs.org/olympiad](http://www.acs.org/olympiad), and so old exams are not recommended for local section selections. Coordinators will receive a pdf of the ACS LSE in February. Printed copies of the exams may be ordered by January or printed locally from pdf. Coordinators and/or proctors will scan the answer sheets provided by ACS and submit them to ACS for grading.

The LSE must be administered in person, it is wise to invite students to one or a few locations. Universities or community colleges are good candidates. This, in addition to being an effective way to host the exam, provides an opportunity for students to visit local university's chemistry department, meet with ACS members: professors, staff and undergraduate and graduate students, especially local ACS Student Chapter members. You can also ship exams to local teachers to administer the exams in their classrooms during or after school.

It is wise to have a tie-breaker ready in case two students have identical scores.

#### ***Recognizing Students and Teachers***

One of the goals of the USNCO is to recognize outstanding chemistry students and the excellent achievements of their teachers. Printed ACS LSE orders will come with complimentary blank certificates that can be given to students. A certificate template will also be sent to all coordinators for local printing and adjusting. Please consider providing similar certificates or small tokens of appreciation to teachers who participate in all levels of the USNCO.

### **National Exam**

The National Exam is provided by the USNCO office free of charge. You will receive the maximum allotment of exams based on the size of your local section. It is to be given during the period of nine consecutive days in April. Please refer to the schedule for the dates of the exam. We request that geographically smaller sections schedule the national examination at a single site on one of the nine days and require that all students be present and take the exam together. Geographically larger sections should schedule the exam for a single day and time but may use different locations throughout the section if necessary.

To preserve the security and therefore, the fairness of the selection process, please make every effort to have all nominees take the national examination on the same day and at the same time. Regardless of the number of sites within your section, all test materials should be returned to you, the coordinator, if possible. We realize that in some instances, this will not be possible, but we would like to reduce the confusion of the multiple packets from a single local section.

As part of the USNCO National Exam, a 90-minute laboratory practical is also administered by ACS local sections. This laboratory practical is meant to test the problem-solving skills of the student in the laboratory. A preliminary detailed list of materials needed for the laboratory practical will be sent to all local sections prior to the exam. This list will be updated and final list will be sent with the exam.

With the gaining popularity of small-scale chemistry, at least part of the laboratory practical will utilize small-scale chemistry techniques.

### ***Number of Nominees***

<b>L.S. Members</b>	<b>USNCO Nominees</b>		<b>L.S. Members</b>	<b>USNCO Nominees</b>
1–1000	10		4151–4500	20
1001–1350	11		4501–4850	21
1351–1700	12		4851–5200	22
1701–2050	13		5201–5550	23
2051–2400	14		5551–5900	24
2401–2750	15		5901–6250	25
2751–3100	16		6251–6600	26
3101–3450	17		6601–6950	27
3451–3800	18		6951–7300	28
3801–4150	19		7301–7650	29

### ***Insurance***

When a laboratory component is included in the National Exam (i.e. in a standard operating year), the ACS will provide excess insurance coverage during the National Exam activities. To ensure proper coverage, a list of all students nominated to sit for the exam and all lab practical sites to the insurance company prior to the exam date. You must submit the proper form to the USNCO office, otherwise students will not be covered by the insurance.

Certified proof of insurance is available from the national office, if needed to secure a site. If you need more information, please contact the ACS Treasurer's office at 202-452-2125.

### ***Administering the National Exam***

1. Before administering the National Exam you must send a list (Excel file) of all nominees who are sitting for the National Exam (student names, addresses and e-mails, teacher names, addresses and e-mails, high school names and address) to the USNCO office. This is important for insurance, recognition, and contacting students who qualify for the study camp.
2. When registering with ACS students will be asked to sign a statement about their obligations and their legal status in the USA. This requirement states that a student must be a U.S. citizen or a legal, permanent resident of the United States (green card holder) in order to take the national exam.
3. **Exams CANNOT be accepted without this signed document. Failure to complete that part of the registration form will automatically disqualify the student from competition.**
4. Programmable calculators, cellular phones or any other device that can access the internet or make copies are NOT permitted during the USNCO Local Section and the USNCO National exams. This rule should be publicized so students come to the exam prepared. The local section may want to have one or two non-programmable calculators on hand for student use.

**IMPORTANT:** Please complete and keep a copy of the "Summary of Local Section Testing" sheet for your records. You will need this information to identify your students by their ID numbers after you receive their Part I test performances by the end of May.

### ***Returning Exam Materials***

In a standard operating year, originals of the exam documents must arrive at the USNCO office on or before a given deadline. Exams received after this date cannot be graded.

Exam materials to be returned are:

- Nominee Acknowledgment Form
- Part 1 Answers, on Scantron sheets
- Part 2 Answers, written in blue books
- Part 3 Answer sheets, used for the laboratory practical

Please review and ensure that all exams have students' ID number.



The students may NOT keep copies of the USNCO National Examination until after the date printed on the exams.

Return the exam materials to the ACS USNCO office (address below) in the provided prepaid envelope. We strongly encourage local sections to send the materials in the prepaid envelope provided to minimize confusion. Do not rely on regular mail.

### ***Receiving Exam Results***

In a standard operating year, results of all student performance on Part 1 is normally sent broken down by performance across ten categories and grouped as “below average,” “average,” or “above average.”

Student scores on Part 2 and Part 3 are not released to coordinators, students or parents/guardians.

Based on the score of their overall performance, some students are recognized with High Honors and Honors and receive an additional certificate from the USNCO national office. Approximately the top 50 students are recognized as High Honors, and the next 100 as Honors. The list of High Honor and Honor students is published on the USNCO website.

**In compliance with the Family Rights and Privacy Act, the USNCO does not release a list of numerical scores of all the students to the general public.**

### ***Recognizing Students and Teachers***

All National Exam Nominees will receive both a certificate and a pin acknowledging their achievement. These will be sent to coordinators to distribute to their students. Student and teacher names in the Excel document provided by the coordinator will be used to generate certificates, and a blank template will also be sent to local section coordinators.

Nomination for the National Exam is a significant achievement. Please notify local newspapers, radio, and television stations of the students (and their teachers) who have qualified to take the national exam in your local section. The ACS Communication's office can assist you in those efforts. Please contact the USNCO office for the official press release.

If possible, organize a larger recognition program. Some suggestions include awarding framed certificates or plaques to students and teachers; providing monetary scholarships/awards; presenting the *CRC Handbook of Chemistry and Physics* to students; inviting students, parents, and teachers to a local section awards banquet; and purchasing USNCO and ACS merchandise for students and teachers. This recognition can bear rich dividends in public relations for the section as well as promote science education among area students and teachers.

### **Study Camp**

Typically within two weeks after the National Exam you may receive an e-mail from the USNCO office at ACS headquarters that one of your students has been invited to the study camp. As local section coordinator, you may be asked to inform the student of his/her invitation. ***Due to the very short time available between the selection and the study camp, we try to contact students directly. Students have 24 hours to accept or decline the invitation. Important documents need to be sent to the student before the study camp and the USNCO office finalizes travel arrangements.*** Students need to return the Statement of Acceptance form immediately.

In addition, the local section is encouraged to set-up a mentoring session with the student. The sessions are meant to help the student learn advanced topics that may not be generally covered in the high school chemistry classroom, such as organic or biochemistry. Through this mentoring, the study camp should be more efficient in preparing the U.S. competitors at the IChO. If there are questions, please feel free to call the USNCO office. [Appendix C of the IChO regulations](#) lists the topics that are recommended areas of proficiency/study for students. These topics have been designated by the IChO and may be in both the study camp and IChO testing.

However students invited to the study camp are not allowed to participate in any external organized group training, beginning when they accept the nomination until the completion of the IChO. Private, individual tutoring or informal studying with fellow camp participants is acceptable. This ensures compliance with IChO regulations. Individuals who do not comply with the IChO regulations are ineligible to be nominated for the IChO competition.

The study camp will be held for two weeks in June. The camp is very intense - much of the time is spent in the laboratory or in lecture. The student should come prepared to work hard and learn a great deal.

The ACS will cover the costs of the students attending the study camp (and the IChO) except for transportation from home to the nearest airport and back. The students will also receive letters of introduction by the Camp Director, the head mentor, camp's schedule, student's roster and all other important information about the camp. The set of practice problems, upon which much of the study at the camp is based and other materials will be included to help the student begin preparing for the camp. (The practice problems will be available on the International Chemistry Olympiad website early in February).

Finally, the student will have to have a Special Power of Attorney, Hold Harmless Agreement and Covenant Not to Sue (provided by the ACS) to be signed and notarized. Students will not be accepted to the study camp unless this document is complete and delivered to the USNCO office.

Please send the Olympiad office copies of news articles arising from your student's selection and attendance at the study camp and/or IChO.

### **International Chemistry Olympiad (IChO)**

The International Chemistry Olympiad (IChO) is an annual competition for the world's most talented chemistry students at the secondary school level. Nations around the world send a team of four students, who are tested on their chemistry knowledge and skills in a five-hour laboratory practical and five-hour written theoretical examination.

**Tools and Support available on the USNCO website [www.acs.org/Olympiad](http://www.acs.org/Olympiad)**

***USNCO Media Kit***

To better promote the program you can use the materials from the USNCO Media Kit available on the USNCO website under the Coordinator tab. You can download posters, flyers and sample social media posts to promote the USNCO program to teachers and students in your Local Section.

***USNCO Merchandise***

Various promotional items have been produced to promote the USNCO. These are useful for giveaway items, recruiting, and recognition. These materials can be purchased through the ACS Store.

***USNCO Webinars***

USNCO Webinars cover various areas of program administration and preparation to support coordinators, teachers, and students. The recordings of past webinars and registrations for upcoming webinars are available on USNCO website.

***USNCO Preparation Hub***

A place for students and teachers to share resources, ask and answer questions, comment on annotated solutions for past exams, and otherwise help students prepare for the U.S. National Chemistry Olympiad.

***USNCO Exam Annotations Project***

High school students, teachers, and other volunteers annotate past USNCO exams to help students prepare. Annotated exams are continuously posted on the USNCO website.

***USNCO Coaching***

Coaching sessions are organized over Zoom and coordinated by the ACS staff. Coaches are recruited from among High School Teachers. Coaches will be compensated. Up to 20 coaches will be recruited and each coach will work with a small group of high school students at a time. Coaching sessions last for two hours on Fridays in January and February before USNCO Local Section Exam.