This manual is meant to assist ACS Local Section Coordinators with the Chemistry Olympiad competition.

Questions about the USNCO can be directed to:
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   Washington, DC  20036
   Phone: 202-872-6328
   Fax: 202-833-7732
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   Website: www.acs.org/olympiad
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U.S. National Chemistry Olympiad 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:

**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 the Local Exam test designed by ACS.

**National Examination** - A three-part exam, you have an option of administering in any order, and you are free to schedule rest-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. The scores are used to select twenty of the top students to attend the USNCO study camp.

**Study Camp** - A two-week training camp to prepare 20 students 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 70 countries participate. Typically, four students accompanied by two mentors comprise a national team. The competition consists of a five-hour theoretical exam and a five-hour laboratory practical. The students also participate in cultural exchange activities.

**Goals of the USNCO Program**

The ACS views the USNCO program as a means of investing in the future of young chemists in this country. 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.
Rules for Participation in the U.S. National Chemistry Olympiad*

The following rules apply to the National Chemistry Olympiad Competition only. For information on local exams, go to local competitions. Local sections are encouraged to develop their own procedures for identifying outstanding students at the local level and choosing national examination candidates.

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 his or her 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 International Chemistry Olympiad competitions or study camps.

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 he or she is geographically located, regardless of where the cyber school is located.

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.
Conflict of Interest Disclaimer

When agreeing to serve as a Chemistry Olympiad coordinator, you are required to disclose any perceived or real conflicts of interests to the USNCO Subcommittee 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.**

Insurance

The American Chemical Society provides an excess insurance coverage during the national examination activities. To ensure proper coverage, the national office must submit 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.

Special Situations

**Students with Disabilities:** The USNCO will make accommodations to allow students with disabilities to participate, as long as those accommodations would not require a fundamental modification of the test standards. Extra time is not allowed. Please contact the USNCO office at usnco@acs.org for more information.

**Translations to Other Languages:** You may translate the Local Section Examinations from English into other languages to encourage participation by non-English speaking minorities. If you do so, please send a copy to the USNCO office.

The **National Exam** must be administered only in English.

Local Section Competition

The local section competition is meant to involve a large number of students and to encourage and recognize excellence in high school chemistry. In addition, the process will select your nominees for the national exam. You can access Local Exams from previous years at www.asc.org/olympiad

Selection of Students

The local section may use any method of selecting nominees to take the national exam. Methods used in the past include USNCO-prepared local exam, locally prepared examinations, chemistry competitions between students ("chemathons"), practical problems, teacher recommendations, science fairs, or some combination of these. In addition, a locally sponsored event may serve as a forum for local recognition.

Please use a method that involves the largest number of students from as many local high schools as possible. **We do not encourage limiting the number of students participating in Local Section competition; unlike in the national exam.** An important component of the USNCO is the stimulation of interest in chemistry and local recognition of as many chemistry students and teachers as possible. Please do not neglect this component by focusing on the national exam only.
You may order the USNCO Local Section Examination from the USNCO office. Since copies of previous USNCO local section exams have been widely distributed, each local section is strongly encouraged to use the present USNCO Local Section Exam to ensure a fair screening process. If you do not use the USNCO Local Section Exam, please do not use either an old Olympiad exam or another ACS exam (either high school or general chemistry). Many students may have seen (or taken) these exams or may take one of them in the future. Funds generated by the sales of the local section exams help defray the cost of the USNCO national examination materials, which are provided free of charge to all local sections.

Please consider when using the local section exam or other written competition that sometimes two or more students will have an identical score. To prevent potential problems, please have available a tie-breaker of some sort, such as a designated question on the exam, an additional question you write, or an evaluation of a student’s school records.

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.).

Recognition for Local Competition

One of the goals of the USNCO is to recognize outstanding chemistry students and the excellent achievements of their teachers.

In an effort to obtain this goal, the ACS national office will provide a complimentary Local Exam certificate with each ordered exam. The participation certificates are meant to recognize all students participating in the local section competition. You will be able to customize the certificates to recognize participation, achievement or outstanding student performance in the USNCO program.

The certificate reads: "This Award is presented to (student's name) for: (participation or outstanding performance) in the U.S. National Chemistry Olympiad Local Competition. Presented by the (local section name) Local Section of the ACS."

Certificates are provided free of charge complimentary with any order of USNCO Local Section Examinations. Local sections may order certificates without purchasing exams for shipping and handling fee.

The USNCO pin is another recognition item for students. These pins may be purchased from the ACS store.

The USNCO Subcommittee encourages the local sections to coordinate a 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 National Chemistry Week merchandise for students. This recognition can bear rich dividends in public relations for the section as well as promote science education among area students and teachers.

Local sections are responsible for all costs associated with choosing local section nominees.

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.
National Exam

The National Exam will consist of three parts: a 90-minute multiple-choice section (Part I), a 105-minute free response section (Part II), and a 90-minute laboratory practical (Part III). You have the option of administering the different parts in any order. The overall test time will be four hours and forty-five minutes, you may schedule breaks between sections of the exam, increasing the total block of time required.

You can access National Exams from previous years at www.asc.org/olympiad

**ONLY students who are U.S. citizens or legal, permanent residents of the United States (green card holders). No more than TWO students from the same school are eligible to take the 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.

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<thead>
<tr>
<th>L.S. Members</th>
<th>USNCO Nominees</th>
<th>L.S. Members</th>
<th>USNCO Nominees</th>
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<tbody>
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<td>1351–1700</td>
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<td>4851–5200</td>
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<td>1701–2050</td>
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<td>3451–3800</td>
<td>18</td>
<td>6951–7300</td>
<td>28</td>
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<td>3801–4150</td>
<td>19</td>
<td>7301–7650</td>
<td>29</td>
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The national examination is scheduled to be given during the period of **nine consecutive days from 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.

**Things to Know Before Administering the Exam**

1. 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.

**Exams CANNOT be accepted without this signed document.** Failure to turn it in will automatically disqualify the student from competition.
2. 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.

3. Scantron® Sheets have to be dark marked by the students prior to the beginning of the exam using their USNCO EXAM IDENTIFICATION NUMBER. Make sure that the students dark mark this number, and use it on the answer sheets for Part II and Part III.

**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**

As soon as the exam is over, gather the exam materials for each student. The exam materials must arrive at the USNCO office on or BEFORE the given deadline. **Exams received after this date cannot be graded!**

Exam materials to be returned are:

- the Scantron sheets
- **Nominee Acknowledgment Form**
- blue books only
- Laboratory practical answer sheets

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.**

Send exams for grading to:

ACS USNCO  
1155 Sixteenth Street, N.W.  
Washington, D.C. 20036

**Recognition for the National Exam**

One of the major goals of the USNCO is to encourage local sections to develop closer ties with area schools and to provide recognition for outstanding high school chemistry students and their teachers. 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.

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.
Upon your request, information from this Excel file can be used to generate certificates for all students taking the national exam and their teachers. Certificates are printed free of charge by the USNCO office.

You can also request blank certificates from the USNCO office and print them by yourself. These certificates are usually sent within two weeks after we receive the request. You may wish to arrange to present the students and their teachers with these certificates at a local ACS meeting or during an award assembly that many schools have at the end of the school year.

How to Prepare the Certificates

If you request blank certificates, before printing them, we suggest that you print out a sample certificate on blank paper and place it behind one of the original certificates to be sure the information falls in the correct place. (It may help if you hold the two sheets up to the light.) The USNCO office uses the following instructions in producing the certificates: Imprint MT Shadow 26 points.

Sample format: JOHN DOE

Score Reporting

In addition to the certificates, the results from the national exam are sent approximately one month after the national exam. Individual performances only on the multiple-choice section are released. Student’s scores for Part I will be released to the local section coordinator.

Based on Part I scores, questions are grouped by topics and the average of the number of correctly answered questions within each topic is calculated. Based on this average, each student's score in a particular topic is compared to the overall average and rated as: below average, average, above average, or outstanding performance. Also the total score is calculated for each student and e-mailed to the coordinator, who can distribute the results to teachers and students.

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<th>Local section</th>
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<th>Stoich./ Solutions</th>
<th>Organic/ Biochem.</th>
<th>Atomic Str./ Periodicity</th>
<th>Oxidation Reduction</th>
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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.

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.** Student needs to return the Statement of Acceptance form immediately. In addition, the local section is encouraged to set-up a mentoring session with the student. If there are questions, please feel free to call the USNCO office.

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.

Student will receive a letter containing the following information:

- **Passport** - the students should send a copy of their passport prior to attending the study camp to the USNCO office. If they do not have one, they should apply for one as soon as possible.
- **Travel** - travel arrangements will be made by the ACS.
- **Attendance** - students must attend the entire camp. They cannot arrive late or leave early.
- **Study camp banquet** - the parents, teachers, and local section coordinators are invited to attend (traveling at their own cost) the study camp banquet I; a RSVP form will be provided.

In addition, the students will also be given letters of introduction by the Camp Director and the head mentor. 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 Camp Director.

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

Teacher Recognition

The teachers of the students who attend the study camp are given special recognition by the Olympiad office. The local section is asked to present this teacher with a certificate (provided by the Olympiad program) at one of their local meetings in the fall. The student can also be asked to attend this ceremony.
and to describe the Olympiad experience. An alternate forum for presenting such a certificate is at an assembly program at the teacher’s school.

**Local Section Mentoring**

In an effort to better prepare the students for the study camp, the USNCO suggests that the local section arrange for mentoring sessions 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. A list of topics and a set of preparatory problems is available online. Through this mentoring, the study camp should be more efficient in preparing the U.S. competitors at the IChO.

**Passport**

A copy of the students’ passports should be sent to Margaret Thatcher, at the ACS USNCO office upon the acceptance to participate in the Study Camp.

The USNCO office will inform students whether or not they need visas for the IChO host country and if visas are needed, they will be obtained by the USNCO office for the entire delegation.

See application form and instructions on how to apply for a U.S. passport.

**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.

**Topics for Study**

Appendices C and D of the IChO regulations list 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.