Guidelines

Guidelines for Organizers

Guidelines for prospective organizers of International Chemistry Olympiad (IChO)

Contents

1. Introduction

This document gives to potential IChO organizers recommendations and suggestions that reflect current (and hopefully the best) practice. However, the formal and official rules are described in the IChO Regulations. All organizers should be familiar with these official regulations. While this current document refers to and elaborates on the IChO Regulations, these suggestions are not part of the Regulations and are not binding to either party. If these suggestions are difficult to apply in practice, or there is a better way of doing things, then the matter should be discussed between the organizers and the Steering Committee.

This document is based upon the work by Jan Apotheker (organization chair of the 34th IChO), the reports of the working groups in Warsaw, Neusiedl and Smolenice and a 2003 Hungarian proposal. The first version was compiled by Gábor Magyarfalvi for the Steering Committee and was extended by Bryan Balazs. The latest extensive update, based on the experience of the 50th IChO organizers, was done in 2019 by Petra Ménová.

This document should be edited and updated regularly, and it should be made available to all interested parties.

2. General timetable for organizers

Before application

The fundamental question to be asked before considering whether to host an IChO is whether there is enough support available to host this event. Organizers are responsible for gathering this support, and support can come from organizations within the host country such as:

- Ministry of education
- National chemistry society
- University

- Chemical industry
- National (chemistry) teachers association(s)

Prospective hosts should apply at least 3 years in advance by submitting a proposal letter to the Steering Committee. The Jury is informed about the details of the bid, and after consideration accepts in a secret ballot vote.

Finances

The cost of organizing IChO depends, among other things, on the country where it is held and the number of participants. The figures range from 700 000 to 5 millions of dollars. Prospective hosts must have adequate financial guarantees before applying to organize an IChO, and it is the responsibility of the host organization to ensure that these financial guarantees are in place.

Venues

Before applying to host the Olympiad, the venue for the practical examination must be clearly established. With the growing number of student participants (240 in 2003, increasing to 300 in 2018), sufficient lab space is an important consideration. Effort must be taken to ensure that the individual lab spaces (and any needed equipment) are as equivalent as reasonably possible.

Sufficient accommodation for students and mentors must also be available, and the two groups must be separated by a distance sufficient to ensure that accidental interaction between mentors and students is not possible once the exam is underway. Each country typically sends four students. The number of people accompanying the students (Mentors, Observers and Guests) averages about three per country (260 in the year 2018).

Organization

It is necessary to have a reasonable number of people within the institution that will serve as the base for the activities. The chair of the Olympiad should be affiliated with that organization in some form.

Several committees need to be formed:

- Organizing Committee, with a number of people responsible for different tasks. Each of the subcommittees is represented on this committee. This is the committee that is formed first and the committee that makes all the decisions.
- Scientific Committee, responsible for the preparatory and competition problems and exam marking (grading).
- Support Committee, which has no function other than endorsing applications for financial and other support. Members may be local mayor, governor, national minister or president, royalty, university rector, Nobel Prize winners, etc.

Year minus 3

At this point, the application has been formally accepted by the Jury, and the chair of the Organizing Committee is now a member of the Steering Committee. He or she should report in the January Steering Committee meeting on the initial progress of the organizing efforts.

At this time there should be:

- A firm commitment of financial support
- A confirmed venue for the practical exam and theoretical exam
- A chair of the scientific committee
- A head of the organizing committee
- A tentative timetable of the IChO (see suggestions in part 5).

Year minus 2

By this time, the venues (for ceremonies and other major events) should be reserved. The scientific committee should have started its work on the exams and preparatory problems. The logo of the Olympiad should be decided upon. Decisions on the excursions need to be made.

Contacts should be made with the government, and verification should be made as to which officials or royalty will be present during the opening or closing ceremonies. Membership of all committees must be established.

Year minus 1

During the Olympiad occurring in this year, the future organizers distribute the first issue of their Catalyzer. They receive the Olympiad flag at the closing ceremony. It is expected The website of the future Olympiad should be live by then. Access to IChO social media sites accounts (Facebook, Instagram, Twitter) is transferred to the new hosts.

At this point, the website should include an overall schedule, links to the regulations and guidelines, locations, major venues, accommodation, placeholder for future registration forms, and contact information.

Registration is organized through the head mentor for each country. The organizing committee can receive the contact data of each country from the Steering Committee and confirm the contact person for the upcoming year.

The head mentors receive an invitation in January. In a few cases, as requested by the mentors, an additional invitation must be sent to the ministry of education or the national chemical society.

The organizing committee should check beforehand with a government agency the visa requirements for different countries. An early discussion should facilitate sensible agreements between the appropriate agency and the organization. A contact person in the visa department is very handy in case of last minute problems.

By September, the first draft of the preparatory problems should be ready.

In January, a Steering Committee meeting is hosted and the major venues (laboratory and classroom spaces, ceremony venues, accommodation, etc.) are visited and discussed. Preparatory problems are introduced to the members of the Steering Committee for feedback.

The year of hosting

- 1st – contact details (1st January): sent to the mailing list of the national contacts obtained from the Steering Committee, asked for the name and contact details of

the head mentor for the upcoming Olympiad. After the confirmation of the head mentor's contact details, all communication was addressed to him/her.

- 2nd – registration (15th January): explained the registration process and all the deadlines.
- 3rd – invitation letter, prep problems (1st February): invitation letter, preparatory problems in doc(x) format, solutions to the preparatory problems, reminder of the registration deadlines, reminder to book the pre- and post-IChO accommodation as soon as possible since it is high season and hotels are usually fully booked over summer.
- 4th – reminder on the country registration deadline (25th February).
- 5th – corrections to the Preparatory problems and their solutions (as necessary, best sometime in April).
- 6th – invoice and payment details (the earlier the better).
- 7th – before you start your journey: final instructions (details on arrivals and transfers to the IChO venues, consent with taking the pictures of all participants and using them to promote IChO, info about health insurance, scans of passports, balance payments of the registration fees, basic info for the students (bringing lab coats, depositing all gadgets, link to the list of guides), typical weather, currency, electricity, what to bring (separate lists for mentors and students).

Some general remarks

The preparatory problems without the worked solutions are published online by 31st January. Preparatory problems with worked solutions are e-mailed to head mentors. The current regulations including the syllabus should either be included in the problem booklet or published on the website. An official e-mail address should be designed to which mentors can send their comments, questions and corrections. A member of the Scientific Committee should be appointed to moderate the discussions in the IChO mentor forum (www.icho-official.org/forum).

By January, it should be clear what glassware, chemicals and solutions will be needed during the practical exam and the respective equipment should be ordered. By May, the final version of both exams should be ready and tested. By June, the organizers should receive the travel details and the names of the students. Participants may want to arrive prior to the official arrival date, and/or depart after the official departure date. They will ask for suggestions on additional accommodation and on tourist activities.

At least two weeks will be needed to prepare the labs for the practical exam.

It has become customary to organize a mock exam. Several volunteers (typically Steering Committee members) come ca 3 days prior to the official arrival day. One day is allocated to the practical exam and another to the theoretical one. The examinees have exactly the same conditions as the participating students and solve the problems within the allocated time. They obtain solutions afterwards; the authors mark their exam papers and then the problems are discussed between the two parties. This has helped immensely to reveal problematic parts and to shorten the discussions during the 1st and 2nd Jury Meetings.

During the Olympiad, the organizers must provide accommodation, food and program for three groups of participants:

- Students (4 per country) + 1 guide for each team (from the organizing country).
- Mentors and scientific observer(s) (maximum 4 per country: 1 head mentor, 1 mentor, maximum 2 observers).
- Paying guests (at the discretion of the organizer, about 5–10% of the mentors and observers).

Observers from the future organizers:

According to the Regulations, 2 observers from the next year's organizing team can come free of charge. Any additional observers pay the observer/guest fee. It is advisable that 1 or 2 observers follow the lab preparations and the students' program.

Some guests prefer to be called observers (or observing guests) instead of guests and to follow the mentors' and observers' program. It is advisable to enquire before the Olympiad how many registered guests are planning to follow the guests' program. Even if the guests decide to follow the mentors' program, they still have to pay the guest fee.

Post Olympiad

A final report must be prepared and submitted to the IChO Steering Committee by the January Steering Committee meeting and should be distributed to all participating countries or published on the Internet.

3. Necessary amenities

The Catalyzer

An editorial board is needed for the Olympiad newspaper, the Catalyzer. This board may also be responsible for other PR activities, such as maintaining the webpage or IChO social media sites. The overall design and some of the articles should be prepared in advance. During the Olympiad, at least 2 photographers, 1–2 reporters, an editor and a graphic designer will be required.

The Catalyzer should appear daily during the Olympiad and should contain news about the student participants and their excursions, articles relevant to chemistry in the host country (e.g. famous chemists or scientific discoveries), jokes, birthday celebrations, etc. The last Catalyzer, distributed after the closing ceremony, contains the allocation of the medals. The Olympiad is a competition between individuals, not countries, so country rankings are never published.

Guides

A guide who stays with the students at all times is needed for each team. Generally, it is advisable to find a guide who speaks the same language as the students. The guides are often university students affiliated with the host organization. It is advisable to have 2 head guides who help organize all the guides and students and who act as liasons between the organizers and the guides. Also 2–3 paramedics/nurses should accompany the students all the time. Several key points regarding guides are summarized at the end of this document.

It is very useful if mentors' guides are appointed as well, ca 6–8 (at least 1 for each bus). They should have good command of English. They can help during jury meetings, translations, discussions, organizing the mentors for transports etc.

Lab assistants

Lab assistants help during the lab exams. It is necessary to have about 1 assistant for every 8 students. Lab assistants should be aware that they may not share a common language with quite a few students. However, there should not be a need for communication with the students except in the case of an emergency. It is very useful if the lab assistants are trained for the practical problems. Several professionals are needed to run the parallel experiments on the day of the practical exam.

General assistants (secretariat, copy and print team, IT specialist)

In the mentors' accommodation, helpers for all sorts of tasks (ca 5–10 persons) come in very handy. A notice board at the hotel with up-to-date schedule and information is also very useful.

Buses

Transportation can be facilitated if people are assigned to the same bus throughout the Olympiad. In addition, it is helpful to have a host person responsible for each bus (guide in the case of mentors; an extra person in the case of students is very handy as guides have plenty of other duties). On the other hand, having no bus assignment might ensure better compliance with the schedule and helps interaction among participants.

Backpack and materials

It has become customary to give all participants a bag or backpack, containing printed general information, a T-shirt, a notepad, writing equipment, and a calculator (students only). The students should get familiar with the calculators before the exam. Then, before the practical exam, the calculators should be collected by the organizer and distributed randomly at the individual workplaces. After the practical exam, the students leave the calculators on the benches and the organizers collect them and distribute randomly on the desks for the theoretical exam. After the theoretical exam, students can keep the calculators. The pens should leave a mark that is easy to read when photocopied or scanned.

Badges

All participants will be given, and should wear, a color-coded badge with their name, country and position (student, mentor, observer, etc.). The badges for the students should indicate their code, e.g. NL-1, US-2, etc. In recent years, the codes were allocated to all participants, including mentors, observers and guests, to facilitate administration. A good idea is to list on the badge the preferred form of address, or "nickname"; this preference must be determined in advance (in the registration form) before the badges are printed. Other useful information might also be included on the reverse side of the badge, e.g. allergies & health conditions, room number, bus number, seat for opening and closing ceremony, label for underage students. It has proved useful to leave a blank space on the

badge, where any special conditions, allergies and requirements could be written in pen by the participants. The badges may also contain a small program summary for the Olympiad (typically inserted into the plastic holder along with the badge).

Catering

Care and discretion should be taken with all meals. Because the standard diet of the participating countries differs tremendously, and there are food restrictions for some religions, a variety of food choices should be offered. Pork or beef is not always suitable for everybody, and vegetarian/vegan food should be made available as well as food suitable for gluten and dairy free diets. The breakfast choices should suit both Western and Asian diets. It is important to clearly indicate the content of the food served. Allergens should be clearly labelled. It is also useful to label the type of meat the meal includes (pork, beef, fish, etc.). Plain white rice should always be provided.

Computers

Mentors are supposed to bring their own laptops. Windows and MS Office have been the unwritten standard. It is vital to make sure there are enough plugs in the translation room.

Teams using a common language usually cooperate and it is useful to arrange the seating order so that the people from the same language group sit close.

Several computers equipped with programs required to edit schemes, diagrams and structures (e.g. ChemDraw) should be available to allow the translation of the captions. However, it is strongly advisable to avoid text in the figures and schemes. An IT specialist who can help in case of computer problems should be available.

Printing and photocopying facilities

Over 150 000 sheets of paper are usually used during the Olympiad. High-speed copiers (at least 3, with backup) and enough personnel (ideally 3 for each copy machine) are necessary to meet the tight deadlines. Avoid low quality paper and staples – autofeeders tend to get stuck when using paper with holes from removed staples. Removable plastic slide binders are preferable.

Documents to be printed/copied/scanned: almost 100 pages of the Practical & Theoretical exam, 3 copies handed out to mentors (2 initial and 1 final, with the grading scheme), translations for 4 students, several proofreading copies per country, 2 copies of the written exam, results before and after arbitrations.

4. The work of the Scientific Committee

Membership

A chemistry professor from the organizing country usually chairs the committee. The members should be academic staff from different fields of chemistry, each with an excellent command of English. An experienced mentor must also be a member of the Scientific Committee and make sure that the problems prepared by the Committee comply with the Syllabus and Regulations of the IChO.

Timetable

The Scientific Committee should have at least two years to work on the exams. Its members should be aware of the nature of the Olympiad and their role during the Olympiad. The importance of this insight cannot be overemphasized due to the unique nature of the competition. The role of the Jury and the importance of the Jury sessions must also be emphasized. Typical IChO problems are different from the textbook, classroom or exam problems that educators typically use. During the two years that the Scientific Committee is functional, there should be regular contact between this committee and the Organizing Committee.

Preparatory problems

The Preparatory problems are the main source of information on the topics specific to the host for both students and mentors. They should provide some general idea and set limits to what might be expected in the competition problems. They should be based on the syllabus and include the advanced fields chosen for that particular year (maximum 6 theoretical and 3 practical). These should be listed separately in the introduction and each should be included in at least two preparatory problems.

The preparatory problems come with worked solutions, but the solutions are initially sent to the head mentors only. It is common to publish the solutions online on 1st June.

Do not underestimate the work required to prepare a consistent problem set. The participating countries scrutinize the preparatory problems in detail, as this is their main source of information before the Olympiad. The committee should take care that the examinations and the preparatory problems are consistent with each other and the regulations. An outline of the exam problems should be ready before starting work on the preparatory problems.

It is not desirable if other advanced fields remain in the preparatory problems without explanation (e.g. hidden in a sub-problem), because many countries will try to cram in training in these fields. Because it is very difficult to avoid touching any other advanced topic, it has become customary to include in the instructions not only the list of advanced topics, but also the list of advanced topics which appear in the preparatory problems (typically just once and very briefly), but will not be included in the competition problems. Authors should be reminded that the advanced topics are introduced to most students in a very limited time (usually in one 3-hour lecture). They will still be high school students, not experts (e.g. their dexterity in the lab or their spectra interpretation skills will still be limited).

The problems should require more thinking than specific preparation. Any factual info (e.g., chemistry of an element or a specific reaction type) that is needed in the exam should also come up in the preparatory problems.

Practical exam

The laboratory procedures, i.e. “recipes” should be prepared with secondary students in mind. All experiments should be thoroughly tested and checked under the conditions that will be experienced during the actual practical examinations at the Olympiad. It is necessary to have at least ten qualified persons to perform the experiments

during the exam (parallel experiments, minimum one in each lab, preferably more if the labs are very big and conditions may differ in different parts of the labs).

When considering the quantities that are to be supplied and the time to be allocated to the tasks, remember that the competitors are high school students who are generally inexperienced lab workers. The length of the exam should be such that most students will have time to attempt to work through all tasks. Emphasis should be put on conducting the experiments (i.e. most points should be awarded for this) rather than on evaluating the results. Theoretical questions in the practical exam, if any, should be limited and should relate to the essence of the experiment.

Every effort must be made to ensure that individual sets of equipment and workplaces are as equivalent as possible.

It is possible to have split laboratory sessions (a morning session and an afternoon session). Alternatively, laboratories can also be rotated in two sessions. The reservations associated with the latter system are that students must be strictly separated and that the organizers must ensure that the equipment has been properly cleaned, dried, and redeployed if reused.

Labels on containers in the lab should use chemical formulas, not names, where possible. If reagents are to be shared by the students, care should be taken to avoid cross-contamination. Common use of equipment or other materials should be avoided if possible. If there is equipment for common use, a system should be in place that minimizes waiting time and provides fair use (e.g. a sign-up list monitored by supervisors).

It is a good practice to authorize a person to decide the policy on lab irregularities and inform all lab staff on this. E.g. in the case of equipment malfunction, like a defective tap, the student involved should be given some extra time.

Now it is a common practice that the laboratory staff carries out product drying products and purity determination. The results are shown to mentors who can check the procedures.

A scheme for grading the experimental results must be based on the results obtained from testing the practical exam. A suggested model that has worked well in the past:

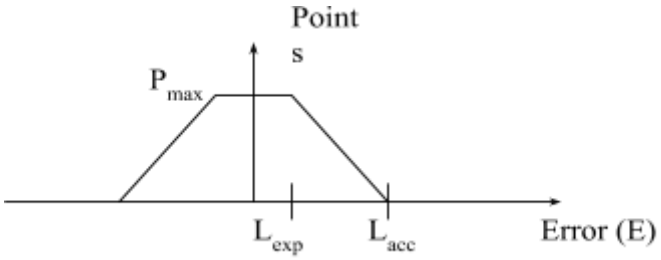
- Full marks should be awarded if the result is in a range that reflects the values expected by the examiners. The expected theoretical value must come from the analytical procedure performed on the exam day (parallel experiments performed by specialists, not competitors).
- No marks should be given for the results outside the limits of acceptable values.

  Both ranges, expected and acceptable, should reflect the examiners' experience.
- Between these two, a linear scale should be applied.

Numerically:	P_{max} points	if $0 \le \lvert E \rvert \le L_{expected}$
	0 points	if $L_{accepted} \le \lvert E \rvert$
	$P_{max}(1-(\lvert E \rvert - L_{exp})/(L_{acc}-L_{exp}))$	if $L_{expected} \le \lvert E \rvert < La_{ccepted}$

(P_{max} – maximum points, E – error, L – range limits)

Graphically:



Typical values for a titration would be:

$L_{expected}$ = 0.5 % relative error in the volume.

$L_{accepted}$ = 3 % relative error in the volume.

Ranges need not necessarily be symmetrical. For example, the accepted range above the true melting point should be rather narrow.

It is a good practice to report about the practical exam (error distributions, yields, comparison of the results obtained in different labs) before the mentors know their students' results (if possible, before the reunion – a short jury meeting No. 2.5 just before the reunion party proved to be very effective). In case of irregularities, the marking scheme can be revised and approved by the Jury.

Students should be allowed to decide on the number of parallel measurements (titrations) they make. Only the final accepted value (typically a mean, but not necessarily so) reported by the student should be graded. Marks should depend on experimental values, but not on precision. This is because students may make up concordant results. The emphasis should be put on marking practical work, therefore the results should be recalculated uniformly based on the student's reported measurements.

Errors in the calculations should invoke a minor penalty. Serious mistakes in applying the rules of evaluation of experimental errors can also be penalized (e.g., rounding errors exceeding accuracy). The magnitude of the penalties should be suggested by the organizers and approved by the Jury.

Students can be penalized for asking for replacement samples, additional reagent(s) and/or glassware. The practice in past Olympiads was that after the first request there was a penalty of 1 out of the 40 practical points for each subsequent request. Students may also be penalized or even disqualified from the practical part for not strictly following safety guidelines.

Unless an exam question emphasizes accuracy and specifically gives guidance on the use of significant figures for that question, the number of significant figures is not marked (graded).

One day before the practical exam, a safety training and demonstration of unique and unfamiliar lab equipment should be included in the students' program.

Safety rules should be published on the website in advance so that the mentors can explain them to the students (thus, the language barrier during the safety training can be overcome). Other information that should be provided on the website before the Olympiad include what equipment will be provided for the competitors (e.g. safety goggles, gloves) and what they are supposed to bring (e.g. lab coats, proper shoes, long trousers, hair bands…).

Theoretical exam

The authors should remember that the contestants are high school students. The tasks should focus on using the fundamentals of chemistry in a unique way that requires thinking. The emphasis should be put on chemistry, not on mathematics. The length of the exam should be such that students will have time to attempt to answer all questions. Currently, the limit is set at 25 000 characters. Long introduction paragraphs on the background of the problems should be avoided. There should be a balance between the classical areas of chemistry. The final weights of the individual problems in the marking scheme should reflect their difficulty.

Unless an exam question specifically gives guidance on the use of significant figures for that question, the number of significant figures in the theoretical part generally is not marked (graded). This is because many members of the Jury like to point out eventual inconsistencies, causing endless discussions in Jury meetings and arbitration.

Marking and arbitration

A detailed marking scheme should be presented with the exam to the Jury. As all possible errors cannot be pointed out beforehand, points for partial solutions should be decided during marking by the organizers and they should be awarded uniformly. For example, if the question is to provide a balanced chemical equation, then partial credit should be awarded to those who correctly identify the reactants and products but fail to balance the equation correctly. The Jury should only discuss partial marks in the most critical cases.

Students are asked and are expected to show their work. This will help in awarding partial marks. However, there should not be a penalty for failing to show each and every minute step, as long as the results are correct. That is, if a student omits some, possibly trivial steps, or uses a different way to get to the solution, he or she should receive full marks if the results explicitly asked for are correct. On the other hand, if only the final result of a complicated problem is given without any supporting explanation, no points are awarded.

All attempts should be made to minimize carrying over results between questions; in other words, obtaining the correct answer for one question should not be necessary to correctly solve a subsequent question. Thus, consequential marking should be used: full marks should be awarded for a question if the student solves it correctly and consistently using a faulty result from another question. There is no double penalty (often referred to as “double jeopardy”). The authors can also provide an arbitrary value to be used in the subsequent question if the student fails to get his/her own result.

Positive grading is usually more helpful for a smooth arbitration process. This means that points should be given for correctly answering individual aspects of a particular question rather than deducted for errors.

A discussion during arbitration is usually unavoidable and sometimes can become quite heated. The situation should be handled tactfully: mentors are usually quite competent professionals even if their command of English may not be perfect.

Responsibilities of the authors of the problems during the Olympiad

- If a mock exam is organized prior to the Olympiad, the authors must be present for the discussions.
- The authors of the experimental tasks must present safety information to the students prior to the practical exam. This must include the demonstration of the use of specific equipment that is unfamiliar to most high school students and would require complex instructions or carries a safety aspect (e.g. specific pipette bulbs, automatic thermometers, etc.), keeping in mind that the demonstration must primarily use gestures and universal signs, as many students do not understand English properly. A short video including lab safety and use of less common lab equipment is also a very good way of presenting these to the students.
- The authors of both the experimental and theoretical problems must be present for the discussion with the mentors before the Jury sessions. They must also attend the Jury session during the discussion of their problem.
- The authors should be available during the translations in case any issues arise.
- The authors, or at least a representative, must be available during the exams to solve any unforeseen problems.
- After the examinations, the answer sheets must be copied at least once. The original is marked by the authors and the copy by the mentors. It is also possible to make two copies for marking and keep the original safe, or to scan the original. During arbitration, the original must be made available if required. It is also advisable to have other graded material available for the arbitration, e.g. TLC plates, prepared compounds, etc.
- The authors mark (grade) the answer sheets. Grading takes a lot of time as does recording of the individual scores of the students. Care should be taken that the name and the code for the student are unambiguous. It proved very useful to have an extra member on the Scientific Committee to deal with the data processing and statistics. The authors are usually too busy with grading to have enough time to process the data.
- A report about the practical work should be presented (error distributions, yields, variations among different labs) before mentors know their students' results.
- The authors are present at arbitrations and lead the discussions for their problems.
- After arbitration, the marks are final. The final scores must be made available for the mentors for the last check before the end of the 4th Jury Meeting.
- Medals are allocated automatically according to the Regulations.
- The Olympiad is a competition between individuals, not countries, so country ranking is not evaluated.
- Extra prizes can be given for the best theoretical work and for the best practical work, but an extra prize for the best female student is not recommended.
- During the closing ceremony, the chair of the Scientific Committee presents the results of the exams.

5. Day by day organization of the different items on the program

Day 1

Arrival of the participants

The Organizing Committee is responsible for the transport of participants from the international airport(s) or other official arrival hubs (railway or bus stations) to the IChO venue. Any means of transportation may be used. Participating countries should provide the travel details of their delegations (typically flight number and estimated arrival time). Incoming delegations should not be kept waiting too long at the airport or at the registration venue.

Assistance to find accommodation for the delegations that arrive early or leave late is very helpful. However, these delegations must cover the additional costs themselves.

Registration

All participants receive a badge with their name, country, participant code and their role (student, mentor etc.). These badges are expected to be worn throughout the event. The list of mentors and observers should be distributed. Passport copies may be collected and any documents regarding the personal data protection might be signed.

Health requirements

All delegates must have health insurance, and this should be checked at registration. Generally, recommendations of the WHO should be followed when special situations arise, such as the SARS crisis during the Olympiad in Greece. A document signed by the head mentor, stating that all members of his team are insured, should suffice.

Academic code

Each delegation is expected to sign an academic code that includes compliance with IChO Regulations and a voluntary communication ban between students, mentors and observers during the critical part of the competition. Checking compliance should be at the discretion of the organizers. It is much easier to ask students to refrain from communication with the outside world. Student guides should keep this in mind. Typically, all communication gadgets (mobile phones, tablets, laptops, smart watches, etc.) are collected from the students and returned after the exams. Since it is a large pile of valuable items, registration and safe storage are required.

An informal welcome dinner is customary in the evening.

Day 2

Opening ceremony

The opening ceremony must be planned well in advance, particularly if officials at the national government level are to participate. These individuals will need to be invited at least a year in advance, although keep in mind that their plans can change at the last minute, and a backup plan should be available. Invitations should also be sent to the embassies of the participating countries and to other appropriate dignitaries.

Awareness of sensitivities between countries is critical. China and Chinese Taipei/Taiwan is a prominent example. It is wise to check the arrangements with the ministry of foreign affairs, as they have a protocol department that can provide advice.

Presentation of the participating teams is a key part of the opening ceremony. This can be done in different ways, e.g. projecting a national flag, photographs from the country or a live stream from the ceremony hall focusing on the team which is being introduced.

After the opening ceremony and subsequent lunch (possibly with a reception), students must be separated from the mentors and observers until both exams have been completed. From this point on, the two groups have different programs as outlined below.

The mentors' program

After the lunch following the opening ceremony, the mentors are taken to the laboratories where the practical examination will take place. They check that the equipment at each workplace is complete and in good order. Each workplace in the laboratory must be labelled with the code of the student that will work there and a map indicating the position of each student must be available so that the mentors can find their students' workplaces. A number of lab assistants should be present to replace the equipment as required by the mentors and to collect the signed check lists.

After leaving the laboratories, the head mentor receives 2 copies of the practical exam and the mentors are transported to the venue where the 1st Jury session is to be held. The discussions in this Jury meeting can be shortened considerably if the mentors can study the problems and have the opportunity to discuss them individually with the authors before the full Jury meeting. Many of the issues may be resolved in a one-on-one discussion with the authors before the task is discussed by the entire International Jury.

During individual discussions and before the Jury meeting, the delegates should be informed of the changes the authors intend to make based on the discussions, e.g. by posting the changes on a notice board. This system is recommended for both the theoretical and practical exams.

After the Scientific Committee has had a chance to discuss the changes suggested by the mentors, the 1st Jury session can begin.

Jury sessions are conducted in English. Language and cultural differences in addition to the large number of contributors can make effective and relevant debates difficult. Thus, it is important to have a strong and fair chair at these meetings. The most successful Jury meetings have been those where the chair allowed the various points to be discussed, insisted on firm written proposals for changes, projected them so that everybody could read them, and then called for a vote. Once the vote had been taken, the item was not discussed further. Procedures can be enhanced by simple rules (e.g. seconding proposals, speaking order).

The person presiding over Jury meetings in which exam questions or marking are discussed should have enough experience with the IChO and mentors in order to have a full understanding of the issues arising and the mentors' point of view. He or she should also be familiar with the tasks. Regulations say that the chair of the SC delegates this role. The established procedure is that the host country nominates the discussion chairs and the names are approved by the Steering Committee.

The Jury sessions may be exhausting, but it is critical that the correctness of the competition tasks be open for discussion and that the authors be prepared to accept the suggestions based on the experience from the previous Olympiads. Phrasing and English spelling corrections should only be discussed if they are necessary to properly convey the meaning.

During the Jury session the text is projected to facilitate discussion of the proposals. The computer operator should be a person proficient in English and familiar with the problems. Several hand-held microphones must be available for all speakers from the Jury and the chair must insist that these be used.

Voting should be carried out carefully. Resolutions and options to be considered should be presented to the Jury very clearly (in writing if possible). Conformance with regulations (majority vote) should be checked. Results should be clearly announced. The problem weights (red points) should be introduced for final voting. The Scientific Committee then prepares the final document for translations. Typically, this is handed out on USB sticks, one for each participating country. At the end of the discussion, the final exam text, marking scheme (blue points) and country must be ready as early as possible but later than the following morning.

Day 3

This is the day set aside for translation. The final versions of the tasks for translations should be distributed as early as possible (at around 6 a.m.) and the translation room should be open at the same time. The Scientific Committee should resist being persuaded to make changes beyond those decided upon in the 1st Jury meeting. Commonly, minor mistakes still appear. Changes have to be announced as soon as possible on notice boards, flip charts or on a screen in the translations room. There should be a deadline (around 1 p.m.), after which no further changes are accepted. After this deadline, the problems are considered as final and the translated versions can be printed.

Teams using a common language usually cooperate and the organizers should arrange the seating accordingly. Because a number of countries are finished fairly soon, it is possible to organize some evening program or a happy hour.

The final versions of the translated exams must be handed in by the head mentor. Four separate documents, each labeled with the student code (XXX-1 to XXX-4) are prepared and printed out. The scans of all the translated exams are made public on the website as a check of the translation quality and its adherence to the original text.

Day 4

This is a day of a half-day excursion for mentors and guests. The mentors receive the copies of the theoretical exam (1–2 per delegation). More time to read the problems at

the expense of tourist program can be considered to ease the work of the Jury. It has worked well in the past to provide time for the mentors to study the exam for several hours. In the afternoon, informal meeting with the authors should be organized, similarly as on Day 2.

The revisions made during the discussion should be available to all teams. At 20.00 the 2nd Jury session should start. For the theoretical exam, a split session has become standard: half of the problems is discussed in one room and the other half in another. After the individual sessions are over, the whole Jury meets and votes on the point distribution and the final version of the tasks. After the text of the final exam has been approved by the Jury, it should be put on the network or distributed on USB sticks.

Day 5

The translation session for the theoretical exam starts as early as possible, usually at around 6 a.m. Any further changes (typically corrections of inconsistencies or typos) should be avoided as much as possible and all the changes should be closed after a certain deadline (ca 1 p.m.). Most countries will be finished by the evening and a happy hour can be held in the evening.

Day 6

During Day 6, the mentors and observers are free. They can be taken on a longer excursion (Amsterdam in Holland, boat trip in Greece) with the guests. If the practical exam results are evaluated, a short Jury meeting can be held to agree on the grading before the mentors meet their students. In the evening, a reunion dinner takes place, at which students and mentors meet for the first time since their separation earlier on. After the reunion dinner, the head mentor receives a copy of the students' answer sheets with the final grading scheme. (Before the actual exam, only the preliminary solutions are distributed, and only in printed form.)

Day 7

Even though the mentors are required to mark the exams, there is ample time for an excursion. In the evening, the 3rd Jury session takes place. The agenda for this meeting, referred to as a "business meeting", is prepared by the Steering Committee (typically changes to the regulations, presentations by the future hosts, nominations for the Steering Committee, etc.). Data from the practical exam are discussed if this was not done earlier.

Day 8

Before the arbitration starts, the head mentors pick up printouts with the detailed results of their students as graded by the Scientific Committee. They compare the points and see which tasks require discussion with authors (all the other exam tasks should be

just signed off if there are no issues). Countries participate in groups determined earlier. The members of the Scientific Committee handle the arbitration for their particular task.

During arbitration, the differences in the grading by the Scientific Committee and the mentors are discussed. It is helpful if both the author and the mentor sign a form with the number of points agreed on for each student. Head of the Scientific Committee should be present during the whole day to help resolve issues. In difficult cases, the delegation may be asked to return later. A panel of Steering Committee members will also be present to assist with contentious points. It is useful to set aside an hour or so after the arbitration for dealing with the unfinished cases. A sign-up list should be available during the day so that everyone can ask for some extra time for discussion. In cases when no agreement is reached, the chair of the Scientific Committee has the final word. If the delegation still disagrees, appeal to the Jury is possible. This appeal must be resolved before the allocation of the medals.

The final marks must be made available to the mentors before the end of the 4th Jury meeting. The mentors should check the students' codes, names and final points. Some time should be allocated for any further discussions and corrections.

In the evening of Day 8, the 4th Jury session takes place. Appeals to the Jury, if any, are dealt with first. After the grading for all the delegations has been settled, the medals are allocated. Since the allocation is automatic, there is no need to present the medal results to the Jury.

If necessary, the rest of the evening is used to discuss the remaining points from the business meeting

Day 9

The closing ceremony usually takes place at a special venue. See the remarks on the opening sessions. The program of the closing ceremony has a number of set items:

- Discussion of the results by the chair of the Scientific Committee.
- Awarding the medals. The medal ceremony starts with the honorary mentions, then bronze, silver and gold medals in this order. The best three overall scores are mentioned separately. It proved very helpful to have 1–2 people on the stage who helped organize the students in lines for receiving medals and taking official photos.
- The handing over of the IChO flag to the next organizer takes place at the end of the ceremony. The representative of the next Olympiad is also allotted some speaking time.

In addition to the above, there are usually some cultural performances and the ceremony is usually followed by a farewell party.

Day 10

Departures of all the delegations.

The Organizing Committee should help with any necessary travel arrangements. Note that some teams depart quite early, sometimes right after the closing ceremony on the previous day.

THE STUDENTS' PROGRAM

The students need some time to prepare for the exams, although some getting-to-know-each-other activity is usually organized. A variety of excursions is desirable, including cultural, scientific and amusement park-type activities. Students also appreciate a bit of free time. Guides should always stay with their delegations. Students who are ill must either be taken to hospital or constantly supervised by a representative of the host.

Day 2

After the opening ceremony, the students are transported to their accommodation. The laboratory safety instruction and equipment demonstration take place either at this point or on Day 3.

Day 3

An excursion is organized, and all the students must take part (except for the ill ones – these have to be under constant supervision). The day and especially the evening before the exams should not be exhausting. Do not schedule the lab instruction late in the evening.

Day 4

Day 4 is the day of the practical exam. During the exam, copies of the official English version should be available to students if there is any ambiguity in their translated version.

Enough drinks and snacks should be provided outside the labs during the whole practical exam.

A clock/timer should be in each lab.

Enough spare equipment should be prepared to be handed out immediately when a student asks for replacement (e.g. broken glassware, non-functional gadgets etc.).

The lab assistants should have good command of English.

The afternoon program should be relaxing, the students will be tired after working 5 hours in a lab and also because of all the stress. Sports activities did not prove good.

Day 5

An excursion is typically organized on Day 5. All the students must take part in the excursions, with the exception noted above in the case of illness or accident. The evening can be free or with only an optional program so that students can study or go to bed early before the exam.

Day 6

Day 6 is the day of the theoretical exam. During the exam, copies of the official English version should be available to the students.

Enough drinks and snacks should be provided during the theoretical exam.

A clock/timer should be in the examination room.

At least one assistant per 30 competitors should be present. The assistants should have a good command of English.

After the exam, phones and gadgets are given back.

The afternoon program may include sports, games and relaxing activities.

Day 7

Day 7 includes an excursion. It is possible to join this excursion with that of the mentors, although it might get too crowded.

Day 8

Day 8 also includes an excursion.

THE OBSERVERS AND GUESTS' PROGRAM

Observers and guests typically follow the same excursion schedule as the mentors, although additional excursions may be organized for the guests during the times when the mentors and observers are busy with various parts of the exam (translation, discussion with authors, etc.). It is useful to ask the guests before the Olympiad whether they want to follow the scientific observers' or guests' program.

6. Checklists

Introductory Note:

This checklist is meant to assist Olympiad host countries by listing all the potential issues that may need to be considered; however, this list is NOT an absolute set of requirements that must all be met. When in doubt, the IChO Steering Committee can assist you with any questions that you may have. Some of the items on this checklist are

more important than the others, and your interaction with the SC will be valuable to determine how much effort should be given to each, thus leading to a successful IChO.

Common sources of problems in hosting an IChO

The following items are common sources of issues in Olympiads and the hosts are encouraged to pay particular attention to these.

- Participants having difficulties obtaining travel visas to the host country in a timely fashion.
- A website which is functional about a year prior to the Olympiad and that has been tested sufficiently for clarity, ability to download relevant documents, ability to register participants in the appropriate category (student, mentors, guests, observers).
- Exams that are either too long or too hard for the students, exam questions that have potentially more than one correct solution, or exam questions which are difficult to be graded consistently (including explaining the grading).
- Payment of the participant registration fees and issues which can arise due to currency exchange rates and bank fees that often change significantly.
- Language barrier – both among the students and the mentors there are always some who do not understand English very well. It is very useful to have people on the organization team who can speak Russian and Spanish.

Year minus 3

- Agreement from sponsoring government/institution(s) on commitment to host.
- Initial selection of the city and educational institution(s) to host the Olympiad.
- Letter of intention to host and approval by the IChO Steering Committee.
- Announcement of intention to host at one of the IChO Jury meetings.
- Approval of the Jury.

Year minus 2

- Seek sponsorship or other sources of financial support (keep in mind any obligations or other commitments that this brings, such as changes to how the IChO is publicized or promoted).
- Develop a preliminary budget.
- Finalize the selection of the city and institution(s) to host the Olympiad, along with the appropriate notifications. Arrange and sign any necessary legal documents or Memorandum of understanding.
- Establish preliminary dates for the Olympiad (generally in July).
- Consider any potential conflicts with major events/religious holidays.
- Consider any potential arrival/departure issues (usually with airports).
- Consider any potential adverse weather issues given the time of year (July).

- Develop general design, logo, theme, and slogan or motto as appropriate.
- Investigate potential locations for major events, such as for the opening and closing ceremonies and exams (classrooms, lab spaces).
- Investigate potential locations for student dorms, mentor/guest/observer accommodation, jury meetings. Regarding accommodation, keep in mind any gender or religious issues.
- Investigate potential excursions and other cultural events.
- Appoint members of the Scientific Committee and Organizing Committee and appoint Chairs for each.
- Begin work on exam problems or at least the overall theme and advanced topics.
- Start making lists of potential volunteers.
- 2nd announcement of intention to host at one of the IChO jury meetings, along with an appeal for any suggestions or anticipated issues.

Year minus 1

- Refine lists of potential volunteers and form committees to do the work (one suggestion is to form subcommittees for Catering, Accommodation, Registration, Graphics, Excursions, Big events (Opening, Reunion, Closing, Farewell), Transportation, PR, Sponsoring, Catalyzer, Web and social media, Staff hire and supervision). Set up conference calls or meetings as needed. Engage the hosts of prior Olympiads for suggestions and ideas.
- Reserve venues for major events, such as the opening and closing ceremonies and exams (classrooms, lab spaces).
- Investigate potential locations for tours and other cultural events. Begin booking with tour companies and/or transportation companies.
- Publicity for the event: IUPAC and other chemical societies, chemical society meetings and publications, UNESCO, Facebook, former Olympiad students, etc.
- Work on the Preparatory problems and Exam problems.
- At the IChO-1, publish and distribute the 1st issue of the Catalyzer (usually at the Farewell Party), remembering to include the customary welcome statements from the organizer(s), IChO President or Chair, government and host institution officials, etc.
- At the IChO-1, identify the person to take over the IChO flag from the host country.
- Develop a website, including the registration form.
- Invitations to countries (usually in January), followed one or two months later by a reminder to register.
- Assemble a list of head mentors' names and email addresses – national contacts are registered with the Steering Committee.
- Investigate facilities and equipment for translation, arbitration, jury meetings.
- Final proofread of the preparatory and exam problems.
- Test the exam questions with graduate students or the like.

Steering Committee meeting (January)

- Letters of invitation and/or letters needed to obtain a visa.
- Arrange transport to/from arrival hubs.
- Reserve lodging/meals.
- Provide tours of exam locations (theoretical and practical), student dorms, mentor/guest accommodation, venues for opening and closing ceremonies, reunion and farewell parties, other relevant facilities, along with arrangements for transportation for the SC and other meeting attendees.
- Finalize and distribute SC Agenda of discussion items, tours, meals, etc.
- Seek the SC members input if there are any issues or concerns, such as countries without a contact person, financing, schedules, venues, etc.

Immediately after the SC meeting (usually January)

- Publish the preparatory problems on the website, along with the dissemination of the solutions to the head mentors.
- Send reminder to countries to register.
- Recheck lists of items needed for practical exam (glassware, equipment, chemicals, vessels for making the stock solutions, safety equipment).

Several months prior to the Olympiad

- Identify and obtain souvenirs for the attendees (backpacks, calculators, T-shirts, notepads, writing utensils, information brochures, trinkets, etc.).
- Finalize times of all events.
- Identify a “Master of Ceremonies” for the opening and closing ceremonies.
- Develop plans for printing the badges, overall programs to fit in the badges, lists of delegations, etc.
- Start developing potential story topics for the Catalyzers.
- Arrange for printing facilities for the Catalyzers (overnight printing required, distribution to both students’ and mentors’ accommodation).
- Secure strong wifi connection in the mentors’ hotel(s).
- Work out how to store (and potentially transfer) the scanned exam papers.
- Arrange any final transportation details, such as airport transportation or buses for the excursions.
- Check with the host city and institution(s) for any known events that might conflict with the Olympiad, such as government, cultural or sports events, etc.
- Keep in mind that participants may want to arrive prior to the official arrival date, and/or depart after the official departure date. Prepare suggestions for accommodation and tourist activities.
- Make a list of the expected attendees and consider how the accommodation can be arranged to minimize any issues due to conflicts between countries, religious or

personal privacy concerns, or potential requests from Mentors/Observers/Guests for single rooms.

- Develop a list of emergency contacts.
- Reserve photographers and videographers for arrivals, opening and closing ceremonies, parties, exams, excursions.
- Arrange for media coverage of the event, as appropriate, and make preparations for issuing press releases during the event.
- Recruit guides for the students.
- Recruit lab assistants and other helping staff.
- Ask government officials and the sponsoring institution(s) for a welcoming letter.
- Things to keep in mind: dietary issues, gender separation, religious preferences, local laws on alcohol/drugs.
- Arrange any needed financial mechanisms, such as bank accounts for the receipt of payments, “miscellaneous fund” to handle expenses as they arise, etc.
- Arrange for printers, photocopiers, scanners.
- Arrange for posters, flip charts, sign-up boards, registration tables.
- Arrange for printing IChO banners, direction signs and other signage.
- Find safe places to store valuables.
- Remind volunteers of their obligations.
- Recheck laboratory exam preparations.
- Recheck marking schemes.
- Develop scoring spreadsheet (Excel or the like) to tabulate scores.
- Emphasize with mentors the need for their students to maintain a “professional appearance” during the opening and closing ceremonies, and to be respectful of other countries considering the size of their flags or other “celebratory materials”.
- Once the student team members are set, verify the age and educational stipulations for Olympiad participants (must not be university students and must be under 20 years of age on 1st July of the year of the Olympiad).
- For the arrival/check-in, refine airport and ground transportation plans, check-in tables, first day meal (dinner) service, badges and agenda booklets, health insurance issues, etc.
- For the Opening Ceremony, verify the venue and meal service, finalize keynote speakers (and backups), delegates from sponsoring organizations, government, etc., determine the speaking order and who will be doing the introductions, prepare draft speeches for various officials who will not be writing their own, determine seating chart for attendees (students and all others, including dignitaries), arrange for translators/sign language interpreters as needed, verify cultural show(s). Identify a student to give a short talk during the ceremony (optional).
- Identify a secure location to store students’ electronic devices after the ceremony.
- For the translations, arrange locations to store the original and translated exams.

- For the Jury Meetings, arrange any needed audio/visual equipment, refreshments, handouts, voting cards, an individual who is fluent in English and with good computer skills, etc.
- For the Reunion Party, verify the venue, entertainment and catering service.
- For the Closing Ceremony, verify the venue, finalize keynote speakers (and backups), determine seating order for attendees (students and all others, including dignitaries), arrange for translators/sign language interpreters as needed, verify cultural show(s), prepare for awarding of the medals (and remember to plan who will give out gold/silver/bronze etc.).
- Purchase medals and other certificates.
- For the Farewell Party, verify the venue, entertainment and catering service.
- Arrange for a mock exam in the days before the Olympiad.
- Sleep well before the Olympiad, there will not be much time to sleep during the event.

Day 1

- Welcome groups at the official arrival hubs.
- Arrange transfers to the IChO hotels.
- Set up registration (enough staff, tables), souvenir distribution.
- Check health documents of attendees.
- Remind students of “Academic Code of Conduct”.
- (Optional) Lunch.
- Welcome Dinner.

Day 2

- Opening Ceremony & reception.
- Remember to acknowledge sponsors.
- Collect communication gadgets from students.
- Provide laboratory safety instruction to students (Day 2 or Day 3).
- Sightseeing for students.
- Take mentors to inspect laboratory facilities.
- Discussions with authors on the practical exam.
- Jury Session #1.

Day 3

- Excursion for students.
- Laboratory safety instruction for students (Day 2 or Day 3).
- Translation of practical exam for mentors.

Day 4

- Practical Exam.
- Discussion with authors on the theoretical exam.
- Jury Session #2.

Day 5

- Excursion for students.
- Translation of theoretical exam for mentors.

Day 6

- Theoretical Exam.
- Return gadgets to students.
- Whole-day excursion for mentors.
- Reunion Party.

Day 7

- Excursion for students.
- Excursion for mentors.
- Mentors grade the students' exams.
- Jury Session #3.

Day 8

- Excursions for students.
- Arbitration for mentors and authors.
- Jury Session #4.
- Provide information about the departure day – check-out times, luggage storage, shuttles to the departure hubs.

Day 9

- Closing Ceremony with awarding the medals.
- Remember to acknowledge sponsors.
- Farewell Party.
- Remember to have notable dignitaries talk with the students during the party (Nobel Laureates in Chemistry?).

Day 10

- Departures.

Other notes

Printouts to be prepared before the Olympiad:

- Voting cards (YES/NO) – 2 sets of different colours if printed with the country name, or 5 sets, each of different colours, one per each Jury meeting
- Sign sheets – list of all delegations (to be used every time head mentors collect or submit any material, and also by head guides anytime students get on buses)
- Envelopes with country codes
- Labels with country codes
- Labels with student codes
- Badges
- Foldable programs to fit in the badges

For the mentors:

- Guides (6)
- Secretariat and copy team (9)
- IT specialist (1)

Shared for both:

- Catalyzer team: photographers (4), reporters (4)
- Social media team (1) + several guides had administration access to both facebook and instagram
- Website coordinator (1)
- IChO mail administrator (2) – forwarded the e-mails to the others when necessary
- PR team (1) – dissemination, care for journalists during major events
- Several helpers

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