

Overview: Syllabi in other Science Olympiads

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Abstract

This article contains an overview of how other Science Olympiads handle the Syllabus issue.

The international olympiads in physics (IPhO [8]), chemistry (IChO [3]), and biology (IBO [2]) have officially defined syllabi, somehow connected to their regulations. On the other hand, the International Mathematical Olympiad (IMO [6]) does not have an official syllabus, and this has been a deliberate decision. It appears that the younger international olympiads in astronomy (IAO [1]), geography (IGeO [4]), and linguistics (ILO [5]) do not have an official syllabus.

1 International Mathematical Olympiad (IMO)

The “General Regulations for an IMO” state in C1:

“The problems should, if possible, cover various fields of pre-university mathematics and be of different degrees of difficulty.”

In current IMO practice, only four general topics occur: Geometry, Number Theory, Algebra, Combinatorics. (This is not an official policy.) Note that these topics are often not covered extensively (if at all) by mathematics curricula for secondary education in many countries.

2 International Physics Olympiad (IPhO)

The IPhO Statutes state in §5:

“The theoretical problems should involve at least four areas of physics taught at secondary school level, (see Syllabus). Secondary school students should be able to solve the competition

problems with standard high school mathematics and without extensive numerical calculation.”

And the IPhO Regulations to §5 state:

“The examination topics should require creative thinking and knowledge contained within the Syllabus. Factual knowledge from outside the Syllabus may be introduced provided it is explained using concepts within the Syllabus.”

The IPhO Syllabus seems to cover all physics generally taught in secondary education. The *Theoretical Part* is divided into 11 subfields: Mechanics, Mechanics of Rigid Bodies, Hydromechanics, Thermodynamics and Molecular Physics, Oscillations and Waves, Electric Charge and Electric Field, Current and Magnetic Field, Electromagnetic Waves, Quantum Physics, Relativity, Matter. The *Practical Part* elaborates on measurement, instruments, errors, approximation and curve fitting, graphing, and safety in laboratory work.

3 International Chemistry Olympiad (IChO)

The IChO Syllabus classifies topics on three levels:

Level 1 These topics are included in the overwhelming majority of secondary school chemistry programs and need not to be mentioned in the preparatory problems.

Level 2 These topics are included in a substantial number of secondary school programs and maybe used without exemplification in the preparatory problems.

Level 3 These topics are not included in the majority of secondary school programs and can only be used in the competition if examples are given in the preparatory problems.

The IChO Regulations state in §10 item (3):

“The organizer cannot give theoretical problems of level 3 (Appendix C) from more than 3 fields and a minimum of 6 tasks should be presented in the set of preparatory problems from each field. Subjects assigned to level 3 can be classified as level 2 if sufficient background is included in the formulation of the problem (e.g. formulas, graphs, structures, equations).”

Also the IChO Syllabus seems to cover all chemistry generally taught in secondary education. The general part of the (new) syllabus is divided into 12 subfields (10 pages in total): The atom, Chemical bonding, Chemical calculations, Periodic trends, Inorganic chemistry, Physical chemistry, Chemical kinetics, Spectroscopy, Organic chemistry, Polymers, Biochemistry, Analytical chemistry. A major part of the syllabus is devoted to safety and the handling and disposal of chemicals. The *Syllabus for the experimental part of the IChO competition* covers: Synthesis of inorganic and organic compounds, Identification of inorganic and organic compounds (general principles), Determination of some inorganic and organic compounds (general principles), Special measurements and procedures, Evaluation of results.

4 International Biology Olympiad (IBO)

The IBO Rules state in §4.1, concerning the selection of topics for the competition:

“All disciplines of biology are acceptable for the IBO.”

In Appendix I, it is stated that “the Theoretical test [...] should cover the following 7 topics in the indicated proportions”: Cell biology (20%), Plant anatomy and physiology (15%), Animal anatomy and physiology (25%), Ethology (5%), Genetics and Evolution (20%), Ecology (10%), Biosystematics (5%). Each of these topic areas is described in more detail (8 pages in total). The section on *Basic Skills for the Practical Part of the IBO* covers such things as science process skills, basic biological skills, biological methods, physical and chemical methods, microbiological methods, statistical methods, and handling of equipment.

References

- [1] IAO, *International Astronomy Olympiad*, Internet WWW-site. <http://www.issp.ac.ru/iao/> (accessed February 2006).
- [2] IBO, *International Biology Olympiad*, Internet WWW-site. <http://www.ibo-info.org/> (accessed February 2006).
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<http://www.geoolympiad.org/> (accessed February 2006).
- [5] ILO, *International Linguistic Olympiad*.
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- [7] IOI, *International Olympiad in Informatics*, Internet WWW-site.
<http://www.IOInformatics.org/> (accessed February 2006).
- [8] IPhO, *International Physics Olympiad*, Internet WWW-site.
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