



# Katedralskolan Skara IB Diploma Programme



## Chemistry course outline (first exam 2016) both Standard and Addition Higher Level (SL and AHL)

### General course description

Chemistry is the study of matter, its structure, properties, composition and the changes that material substances undergo. It is called the central science, as chemical principles underpin both the physical environment in which we live and all biological systems. The course includes essential principles such as: atomic structure, periodicity, chemical bonds, organic chemistry, stoichiometric chemistry and different types of chemical reactions with its energetic and kinetic aspects. In addition to the above, one options are to be covered.

The core materials are studied by both SL and HL students. HL students are required to study some topics in greater depth and to study extension material of a more demanding nature in the common option. The distinction between SL and HL is in both breadth and depth.

Chemistry is a subject worth studying on its own and will develop awareness of how scientists work and communicates with each other. And in addition to that it is also a prerequisite for many other courses in higher education. As examples medicine, environmental science and biological science can be mentioned.

### Topics /core/options

Core (95 hours)	Hours
Topic 1: Stoichiometric relationships	13.5
Topic 2: Atomic structures	6
Topic 3: Periodicity	6
Topic 4: Chemical bonding and structure	13.5
Topic 5: Energetics/thermochemistry	9
Topic 6: Chemical kinetics	7
Topic 7: Equilibrium	4.5
Topic 8: Acids and bases	6.5
Topic 9: Redox processes	8
Topic 10. Organic chemistry	11
Topic 11: Measurment and data processing	10
Additional higher level (AHL) (60 hours)	Hours
Topic 12: Atomic structure	2
Topic 13: The periodic table – the transition metals	4
Topic 14: Chemical bonding and structure	7
Topic 15: Energetics/thermochemistry	7
Topic 16: Chemical kinetics	6



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Topic 17: Equilibrium	4
Topic 18: Acids and bases	10
Topic 19: Redox processes	6
Topic 20: Organic chemistry	12
Topic 21: Measurement and analysis	2
<b>Options* SL/HL 15/25 H</b>	<b>Hours</b>
A: Materials	
B: Biochemistry	
C: Energy	
D: Medicinal chemistry	

\*One option out of four is studied. The option studied will be decided by the teacher together with the students and can change between different classes and years.

The time spent on the different topics is presented below:

SL = core + option + practical scheme of work = 95 + 15 + 40 = 150 hours

HL = core + AHL + option + practical scheme of work = 95 + 60 + 25 + 60 = 240 hours

## Methods

A variety of methods is used to teach Chemistry both to reflect the IB learner profile and to engage the interest of all students. A wide range of techniques are being used. Theoretical and practical moments are closely integrated and used together for giving the students a better understanding of the subject. The teaching in chemistry will give knowledge and understanding of facts, concepts, terminology, methodologies and techniques used in chemistry. The students will also be able to apply their knowledge in different chemical situation.

In addition to that the students will work with chemical investigations. When doing that the students will develop the ability to formulate, analyse and evaluate hypotheses, research questions, methodologies, techniques, data and scientific explanations.

All of this is done during theoretical lessons, laboratory work, simulations, group 4 project and practical investigations. The topics are studied one at a time. There will be a test in the end of each topic to make sure that the students have the ability to apply their knowledge.

In addition to learning chemistry the students will also develop their way of reflecting, thinking and communicating. They will also be able to explore new ideas and how to learn independently and with others.



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## Link to core

Students will during the chemistry course discuss a variety of different questions concerning TOK (theory of knowledge) and chemistry. As examples discussions about the following questions can be mentioned:

- How does the use of universal languages help and hinder the pursuit of knowledge?
- Why is it important to have just one “scientific” language?
- How does scientific knowledge progress?
- How can our everyday experiences limit our ways of understanding for example Avogadro’s constant?
- How can we know that there are subatomic particles when we cannot observe them directly?
- Classification and categorization, how does that help or hinder the pursuit of knowledge?

The students will also develop their international mindedness during the course. SI-units, chemical symbols and equations provide an effective way of communication amongst scientists all over the world. There is also a discussion about the importance of some chemical reactions such as the Haber process. Another important issue is discussions about the industrialization and what it has led to. This environmental issue is of international interest and importance.

## Assessment

### Internal

In chemistry there is one compulsory internal assessment. The internal assessment (10 hours), where the student designs their own investigation and later performs it, evaluates and presents it. This is an individual piece of work, and the report written by the student will be internally assessed by the teacher and externally moderated by the IB at the end of the course and makes 20% of the final grade.

There is also the group 4 project (10 hours) which is the same for all group 4 subjects. It is an interdisciplinary activity and all students studying the Diploma Program must participate. It is an activity where the students learn to interact and collaborate with other people. The group of students solves problems together in a group to come up with solutions to given problems.

### External

The SL exam consists of:

Paper 1, with 30 multiple choice questions based on the core syllabus. This contributes with 20% of the final grade.

Paper 2, consists of short-answered and extended-response questions on core material. This contributes with 20% of the final grade.

Paper 3, consists of questions on core and SL option material. This contributes with 20% of the final grade.

The three papers are sent for external marking by the IB.



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The HL exam consists of:

Paper 1, with 40 multiple choice questions based on the core and the AHL syllabus (about 15 of the questions are common with SL). This contributes with 20% of the final grade.

Paper 2, consists of short-answered and extended-response questions on core material. This contributes with 20% of the final grade.

Paper 3, consists of questions on core, AHL and option material. This contributes with 20% of the final grade.

The three papers are sent for external marking by the IB.

## **Course material**

C. Brown & M. Ford, *Chemistry – developed specifically for the IB Diploma* (2009). Pearson Education Limited

## **Teacher and email**

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## **Further information**

[Link to Diploma Programme Curriculum briefs](#)