

Subject group and course title: Group 4 - Chemistry

Course purpose:

IB Chemistry belongs to group 4 subject. As a scientific course it combines academy study and theoretical knowledge along with the development of practical and investigational skills. The two-year syllabus aims in the development of content-orientated and critical thinking skills as it would be expected by any experimental scientist. The course not only ensures to cover the essentials for the sciences students required in universities but also aims for higher skills. The development of the enquirer scientist. The scientific method is the key concept included in all units of the course and promotes the formation, testing and analysis of experiments. Through this problem solving and analytical skills along with suggestions and improvements should be performed by the students. Laboratory skills and performance is enhanced through the course.

Topics covered (in order taught during the two years)

The course consists of basic fundamental notions of chemistry, including quantitative chemistry, atomic structure and the periodic table, bonding theory, chemical kinetics, energetics and equilibria, theories of acids and bases and redox chemistry and an introductory unit in organic chemistry and instrumental analysis using basic spectrometry techniques. In almost all units many examples and links from everyday life, the environment, pharmacological sectors and industry are given in order to make a coherent connection between the theory and practice.

Assessment model

In class presentations on all units are the basic way of explain the contents of the addressed unit. Along with that the use of internet, simulation webpages on experiments is performed by students. Assessment quizzes in class and after class are given to students to enhance their understanding through content and concept based questions as a form of a formative assessments. Students are asked to communicate verbally and written certain tasks that enhance their collaboration and social skills. In-class quizzes (kahoot) enhance students understanding as well.

End of unit tests performed in a exam like environment promote summative assessments. Questions from past papers and questions bank are used.

End of each semester exams on the topic covered so far are performed in exam like conditions.

How are key concepts served (methodology)?

Change and relationships are the main key concepts of the course. Chemistry the science of change, from atoms to molecules to reactions and products.

How does the course foster international mindedness?

Chemistry as a science is based on theories and experiments performed by experimentalists and enthusiasts throughout the world. In some cases these people collaborated to common projects for a common goal and in other cases they may have concluded to the same result following different paths without even knowing each other. Application of chemistry for the improvement of our life is something that affects us globally.

How are IB Learner Profile attributes promoted?

As an example, in unit 2 upon discussion of the atomic model theory students are asked to make a presentation on their understanding of how and why models in science exist and how they keep changing. Through this presentation students will be able to enhance the “communicator” learner profile.

Through their laboratory work students learn to become inquirers while they learn to use databases online and scientific articles.

Considering the effects of chemistry in our everyday life such as, acid rain or whether renewable energy sources are a clean source of energy students consider the implications and through debatable discussions learn to be open-minded.

How does the course meet student needs via ATL?

Teaching is being performed by the use of many tools addressing the needs of students. By asking in-depth questions after the unit presentations and by short quizzes students develop thinking skills. Performing collaborative work in the laboratory and with certain in class exercises social and communication skills are enhanced. Laboratory work poses as a unique chance for students to develop their research skills. Teaching is conceptually focused and each topic is linked to the key concept.

Describe connections with CAS

Recycling in school and out school premises is linked with topic of redox and oxidation. Students can organize recycling teams and make certain spots for the collections of batteries and other electronic apparatus. They can link that action with their investigation on extracting the copper or gold from old electronic circuit boards.

Describe connections with TOK

In topic 4 bonding and intermolecular forces are discussed. Along with that, hydrogen bonding is discussed as an important intermolecular force. The nature of this force is a topic of much discussion between scientists until today. Definitions in chemistry (through IUPAC) gives several criteria for hydrogen bonding. In class discussions on how specialized vocabulary can help or hinder the growth of knowledge.

Topic 5, covers the fundamentals on energy transfer and transformation in chemistry. Hess' law is directly linked to the concept of conservation of energy. Students are asked to reflect on the challenges of applying general principles to specific examples.

Other questions such as “How do we distinguish science from pseudoscience?” or “What is the relationship between a scientist’s expectation and their perception when scientists performing experiments?” are links to TOK with the chemistry syllabus.

Recommended resources

phet, webMO

Instructor’s name

Dr. Evgenia Douvogianni

Platon Diploma