Chemistry

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Preface

Students nowadays are confronted with a society which is characterized by a highly competitive and integrated economy together with rapid scientific and technological innovations. The fast growing knowledge-based era demands them to equip with the skills to learn independently. In order to meet the challenges posed by these developments, the chemistry curriculum in our school aims at developing students with scientific literacy and at the same time building essential scientific knowledge and skills for lifelong learning in science and technology.

Objectives

The chemistry curriculum enables our students to

1. acquire an understanding of chemical concepts and knowledge.
2. sustain and develop the curiosity and interest about the natural world in chemistry.
3. acquire the skills and procedures of scientific investigations.
4. understand and respond critically to science related issues so as to apply the learned knowledge to make decisions and solve problems.
5. acquire an ability to communicate using the language of chemistry.
6. appreciate chemistry learning and its application in everyday life.
7. be aware of the social, economic, environmental and technological implications of chemistry and show concern for the environment and society.
8. recognize objectivity as well as limitation of science.

Chemistry Learning and Teaching Strategies in LKKC

To facilitate students' acquisition of the capability for self-learning skills and lifelong capability, it has been a long-term tactic to include a great variety of learning activities in our subject. Teaching strategies such as application-first approach, scientific investigations and inquiry-based learning are adopted where appropriate to enhance students' understanding of contemporary issues.

Students in our school are with high academic calibre and teachers are experienced. The curriculum design in our subject builds upon the existing experiences to strengthen our merits and at the same time adopts new strategies to get ready for the changes. The following strategies are adopted :

1. Teachers

2. Curriculum Planning

3. Teaching and Learning Activities

1. Teachers

(1) Collaborative compilation of teaching materials

Teachers compile materials in collaborative manner and share the same teaching materials. This enhances the use of resources in particular time and facilitates the exchange of teaching ideas.

Preparing teaching materials

(2) Peer observation of lessons

Mutual observation of lessons with predetermined topics of focus is carried out. This is followed by subsequent discussion of weakness and strength so as to enhance teaching effectiveness and professional dialogue.

Mutual lesson observation

(3) Professional training

In order to keep abreast of the up-to-date knowledge and the rationale of the curriculum, professional training profile is compiled to facilitate teachers to attend relevant training courses.

2. Curriculum Planning

Our chemistry curriculum consists of compulsory and elective parts. The compulsory covers a range of content that enables our students to acquire an understanding of fundamental principles and concepts, and scientific process skills in chemistry.

Having taken into account students' ability and the past experiences of implementing chemistry curriculum in our school, we adopt the teaching sequence shown in the chart.

Planet earth
↓
Microscopic world I
↓
Metals
↓
Acids and bases
↓
Redox reactions, chemical cells and electrolysis
↓
Microscopic world II
↓
Chemical reactions and energy
↓
Rate of reaction
↓
Chemical equilibrium
↓
Fossil fuels and carbon compounds
↓
Chemistry of carbon compounds
↓
Patterns in the chemical world

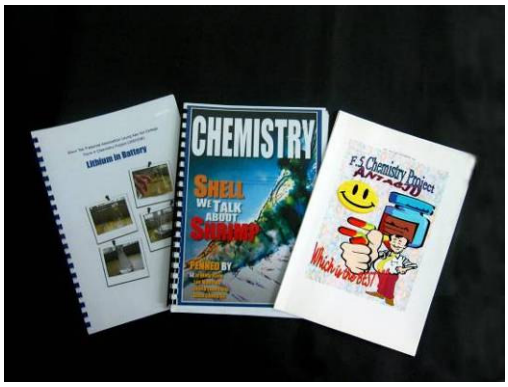
The elective part provides flexibility to meet the diversity in interests, abilities and aspirations of students and at the same time enables an in-depth and extended study of some topics in the compulsory section. Based on the interest and calibre of students, the following two topics are chosen ：

- **Industry chemistry**
- **Analytical chemistry**

To provide an opportunity for the application and integration of knowledge and skills, investigative project is also incorporated in the curriculum.

C. Teaching and Learning Activities

We believe that motivation and interest are essential student characteristics in active and effective learning. A number of student-centred activities are included in the subject content. The activities are not limited to experimental work and scientific investigation involving chemical concepts. Since socially related aspects are always more interesting and relevant to real life, debate, discussion, project work, decision-making exercise, information search and visit in relation to STSE issues are also included. Not only do students develop scientific thinking but also problem solving, communication skills, information handling skills, critical thinking and the making of informed judgments.



Investigative project samples

(1) Discussion

Group discussion is commonly adopted in our lessons. Students talk with each other in order to share information about the topic and find out the answers to a problem based on all possible evidence. This classroom strategy manages to let our students think intellectually and scientifically. The practices sharpen their wits and communicative skills in a friendly learning atmosphere.


Conducting investigative projects

(2) Debate

Students conduct debate on topics with STSE connection in lessons. Research, strategy and coordination are essential for success in debates. The activity encourages students to think critically from different perspectives and hence increases their understanding of concepts. They acquire the opportunity to criticize and tolerate different viewpoints.


Presenting arguments and taking notes in debate

(3) Decision-making exercise

Another commonly found activity in chemistry lesson is decision-making exercises which provide a situation for students to evaluate the alternative solutions to a problem and choose a course of action based upon the analysis. Students become aware of the necessity to give reasons to support their decisions.


Discussion in decision making exercises

(4) Project and Practical work

Projects provide students with the chances to carry out in-depth study of a topic. Students gain the opportunity to apply the various generic skills they have acquired. Our subject has tried out the following tasks:

Analyzing unknown sample

- F.3 students construct concept map and write reflection passage on selected STSE current issues.
- F.4–6 senior students work on investigative projects which cover experimentation and data processing with a view to solving an authentic problem. In addition to verbal and report presentation, students also design poster to present their findings.

Practical work is a common activity in science to offer students hands-on experience of manipulating apparatus and clarify scientific phenomenon learned in lessons. Assessment of practical work further enables teachers to evaluate students' performance as well as to provide feedback for improvement in learning.

(5) Competition

To further enrich the learning exposure and widen the scope of applying what students have learned, participating in external competitions such as the Chemistry Olympiad, Student Science Project Competition (HKSPC) and Hong Kong Youth Science & Technology Innovation Competition (HKYSTIC) are also our students' enthusiasm.

Scoring merits in competitions

Chemistry Olympiad, HKSPC & HKYSTIC		
Year	**Project Title**	**Merit**
2008	Bleaching hazards (白色恐慌)	Highly Commended Award
2009	Magnetized water (磁化水、偽科學?)	Highly Commended Award Most Popular Team Award
2010	Corrosion (Cu) in washroom (銅歸於盡)	Outstanding Award
2011	Glue Power	Highly Commended Award
2012	Bingo gel	Second-runner up
2013	Revealing Browning secret, Enjoying a desirable diet	Outstanding Merit
2014	Scumless soap	/

(6) Visit

Educational visits are particularly valuable activities to enable students to visualize how theoretical principles can be put into useful practice in everyday life. Whenever time and resources are feasible, visits and participation in science seminar are organized. To make the activity a rewarding learning experience, students need to complete worksheets which guide them to take notes and ask questions.

Attending lecture in university

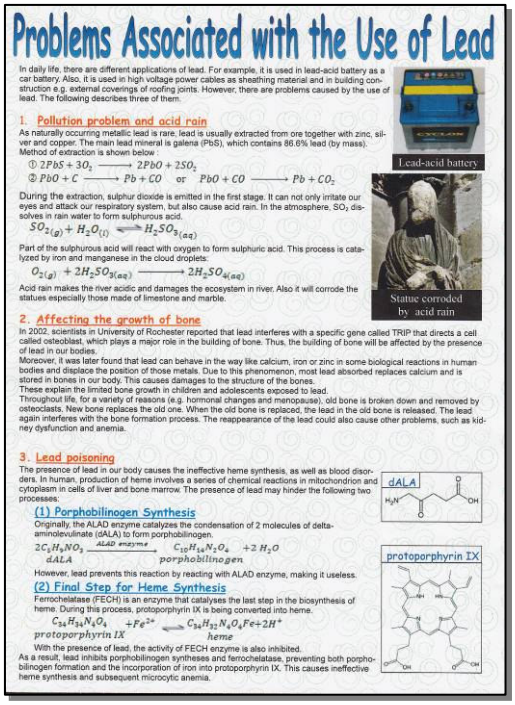
The Road Ahead

Not only do the above-mentioned teaching and learning activities aim at maximizing the learning benefits for students but also the accumulation of knowledge also provides valuable experiences as well as foundation for teachers to give full realization of the rationale in the curriculum. By these, we look forward to providing a learning environment that enables our students to learn Chemistry in an enjoyable and enriching manner.

Visiting research laboratory

Visiting chemical plant

Experiencing advanced laboratory work



Explaining project to adjudicators

Displaying project work