

CHEMISTRY IN OUR LIVES

THIS TOPIC IS IN SIX PARTS

Part 1 PEOPLE AND CHEMISTRY

A brief introduction to the topic with an illustration to show the range of chemical products people use every day. This introduction highlights one of the main themes of the topic, which is that chemical substances are everywhere and it is impossible to consider living without them.

Part 2 CHEMISTRY IN OUR HOMES

A survey of chemical products in the home. A study of the labelling of one chemical product. Also an opportunity to make a chemical product.

Part 3 LIVING WITH CHEMISTRY

Research by interview, or from secondary sources, to investigate a local story related to chemistry and to discover an example of the importance of chemistry to the local, regional or national economy.

Part 4 EXCHANGE INFORMATION

Collation of information and exchange with other schools.

Part 5 COMPARING INFORMATION FROM OTHER COUNTRIES

Comparisons and discussion of responses from different countries.

Part 6 INFORMATION SECTION

Table showing formulae and names of some chemical substances in different languages.

THE AIMS OF THIS TOPIC ARE:

- to increase students' awareness of the importance of chemistry in our everyday lives,
- to increase students' understanding of how to live safely with chemistry,
- to show that chemical substances can mix or combine to form new products,
- to compare aspects of the applications of chemistry in different countries.

This topic will fit into the chemistry curriculum in the first four years of secondary school and illustrates the following fundamental themes of any chemistry course:

- *all materials are made up of chemical substances or mixtures of them*
- *chemical substances can react together to make different substances with new properties*
- *chemists make new substances by mixing elements and compounds, while controlling the conditions, to produce useful products.*

In Parts 1 and 2 students find out more about the many chemical products which people use in their homes. They also examine the labelling of these products and learn about the international symbols for labelling chemical substances. They have an opportunity to make and test a chemical product.

In Part 3 the students examine the importance of chemistry outside their homes in their locality, their region or their country. This provides opportunities to study what chemists do in their work and the importance of chemistry to the economy.

Students exchange their findings with students in others countries. Then they discuss similarities and differences in the impact of chemistry and its products in different parts of the world.

PRIOR KNOWLEDGE AND SKILLS

The topic is intended for use with students ages 12–16. It is assumed they will have the following prior knowledge and skills.

Knowledge and understanding

Before the students use this topic, they should be aware that:

- some materials are pure while others are mixtures of chemical substances,
- chemistry has developed techniques for separating pure substances from raw materials.

Skills

students should be able to:

- handle common chemical substances safely,
- extract information from secondary sources,
- conduct an interview.

INSTRUCTIONS FOR TEACHERS

Requirements

Before beginning the topic provide photocopies of the students' pages for each group of students. It may be helpful to let students see a copy of the Exchange Form at the start so they know what they are aiming to complete during the activities.

Part 2

It will help students to record the results of their surveys if you can give them copies of the table on page 2 of the Exchange Form. For Activity 2 it may be helpful to provide the class with a selection of packages from chemical products with labels on them. It is safer to provide empty containers. Warn students not to touch, taste or smell the contents of any containers which are not empty.

For Activity 3 the requirements will depend on which product you and your students decide to make. The choice of product is left open so that you can choose an activity which is practicable, safe and relevant. Before trying any practical work you must check that it is allowable in your school.

Part 3

Students will need access to a range of sources including text books, library books, directories and so on. A chemistry society or association may be able to provide information about the industry in your country. The programme's web site will give ideas for people with access to the internet. The address of the web site is: www.scienceacross.org

Part 4

Students will need a few copies of the Exchange Form to send their findings to other schools. If you have internet access your students can complete the form on-screen and then send it to other schools by e-mail or fax.

Establishing communication links with other schools before starting detailed work on the topic helps to keep work in step so that the feedback is more immediate. Some schools enjoy exchanging ideas and progress reports by e-mail while they were working on the topic.

SUMMARY OF THE TOPIC

Part 2 Chemistry in our homes

Introductory chemistry courses often concentrate on pure substances, especially elements and compounds. Separating simple mixtures to make pure substances is often a starting point. The survey in this part of the topic, however, will show students that mixtures are very important. Most useful chemical products in our homes are mixtures. Formulating useful products is an important task for people who work in this field.

Bear in mind the need to be sensitive when asking students to carry out home surveys. Some adults at home may be unhappy if information about home life is reported at school.

Consider discussing the quantities of chemical products which people keep at home. Chemical products may be safe in small quantities but dangerous in larger quantities.

Here are some possible products which you and your students might make:

- crystals of a salt,
- glue,
- soap,
- a cosmetic cream,
- emulsion paint,
- nail lacquer,
- a scented chemical,
- a food flavouring,
- a coloured bead of glass
- a sample of cloth dyed with a natural dye.

Part 3 Living with chemistry

Each group of students might do either 4 or 5 to save time. In Activity 4 it is only necessary to tackle one of the options A, B or C, but if each group chooses a separate topic, they can then report back to the whole class.

In some regions it may seem hard to find a local example of chemistry in action. It is not necessary to choose a big industrial example. Small-scale versions of processes are worth considering such as local brewing or extracting oils, dyes or sugar from plants. Also consider finding out about the work of a pharmacist who may formulate medicines as well as dispensing them.

Consider inviting someone involved in chemistry to come to school to talk to your students while they are working on this part of the topic.

Part 4 Exchanging information

When the students have completed Parts 1, 2 and 3, the class has to decide what to write on the Exchange Form. The class might vote to decide which stories and case studies should feature on the Exchange Form for Activities 4 and 5 in Part 3 of the topic.

Students can use a mixture of words and diagrams on page 4 of the Exchange Form.

Send copies of the form to the schools with which you have chosen to exchange information.

Part 5 Comparing information from other countries

When you have received the Exchange Forms from other schools, copy the Exchange Forms that you have received and the class's own Exchange Forms for comparison and analysis.

After receiving Exchange Forms from other schools, compare and discuss the responses with the help of the questions.

Further activities

Here are some suggestions:

1. At the start of the topic give students copies of a label saying: 'This is a chemical substance'. Ask them to stick the labels to products around their home. In this activity you can discuss with students the idea that every material thing can be regarded as being made up of chemical substances (pure or mixtures).
2. Give students copies of the international hazard symbols for chemicals (as on page 2 of the Student section). Ask the students to label chemical products in their homes with the labels.
3. Choose one everyday product, such as the substance used to clean teeth. Make a special study of the product:
 - what it is made of,
 - its origins,
 - its properties,
 - the labelling on the package,
 - the history (what people used in the past in place of the modern material).
4. Create an exhibition or display in your school to tell other students about the work done by your class and what they have found out about chemistry in other parts of the world.

Sources of information

The Science Across the World web site will list useful sources of information especially to help students with the activities in Part 3.

