

## Education and Manpower Bureau Circular Memorandum No.132/2004

From: Secretary for Education and Manpower      To: Heads of all secondary schools

Ref: EMB/CDI/SC/909/1

Date: 7 June 2004

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### Learning and Teaching Resources on Safety in Science Laboratories and Results of the Survey on School Laboratory Accidents (2002/03)

(Note: This circular memorandum should be read by all secondary school heads, teachers and laboratory technicians of the Science Education Key Learning Area.)

#### Summary

The purpose of this circular memorandum is to inform schools of the distribution of the resource package “Learning and Teaching Resources on Safety in Science Laboratories” and the findings of the survey on school laboratory accidents for 2002/03 school year.

#### Details

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2. The Science Education Section has recently developed the package to facilitate teachers in planning and conducting lessons on laboratory safety. Heads of schools are requested to complete the collection form at *Annex I* and send a staff member to collect the resource package at the Curriculum Resources Centre, Curriculum Development Institute, G/F, 24 Tin Kwong Road, Kowloon from **21 to 30 June 2004**.

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3. Besides, the survey on school laboratory accidents for 2002/03 school year has been completed and its findings are summarised in the report at *Annex II*. Heads of schools are requested to bring the contents of the report to the attention of their science teachers and laboratory technicians.

4. Three repeated seminars will be conducted on **23 and 24 June 2004** to introduce the resource package and the findings of the laboratory accident survey. Details of the seminars are posted on the Training Calendar of Education and Manpower Bureau ([Course ID: CDI020040427](#)).

#### Enquiry

5. For enquiries, please contact the Science Education Section at 2712 8476.

Y T LAU  
for Secretary for Education and Manpower

c.c. Heads of Sections / Government Primary Schools - for information

## **Collection Form**

### **Learning and Teaching Resources on Safety in Science Laboratories**

**Date, Time and Place of Collection**

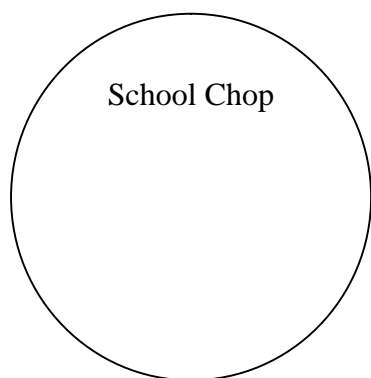
**Date:** 21–30 June 2004

**Time:** Monday to Friday (except public holiday)  
9:00 a.m. – 12:30 p.m. & 2:00 p.m. – 4:30 p.m.  
Saturday 9:00 a.m. – 12:00 noon

**Place:** Curriculum Resources Centre, Curriculum Development Institute,  
Education and Manpower Bureau,  
G/F, 24 Tin Kwong Road, Kowloon  
(Tel: 2762 7549)

To: Chief Curriculum Development Officer (Science)  
Education and Manpower Bureau

Please issue four sets of the above resource package (overall dimension: 30 cm x 21 cm x 2 cm; total weight: 1 kg) to the bearer of this form.



Signature of Principal : \_\_\_\_\_

Name of Principal : \_\_\_\_\_  
(in block letters)

Name of School : \_\_\_\_\_

Telephone No. : \_\_\_\_\_

Date : \_\_\_\_\_

## **Report of the Survey on Laboratory Accidents in Secondary Schools in 2002/03**

### **Background**

As one of the ways to monitor the standard of safety in school science laboratories, the former Education Department conducted annual surveys of laboratory accidents occurring in science laboratories from 1995/1996 to 1999/2000. The findings have been disseminated to all secondary schools and summarised in the handbook *Safety in Science Laboratories (2002)* and the web pages of the Science Education Section, which draws their attention to accidents that are common in science laboratories, as well as preventive measures that can be taken. As the findings of the five surveys are similar and in order to streamline the administration procedures, the survey will be conducted on a triennial basis as from 2003/04 to collect up-to-date information about the standard of laboratory safety in schools. This report presents findings of the survey for 2002/03 school year and recent developments on laboratory safety.

### **Results and Observations**

The survey for 2002/03 revealed that there were decreases both in the number of schools with laboratory accidents as well as the number of accidents as shown in **Appendix**. In the 422 secondary schools that responded to the survey, 274 schools (65%) reported that no laboratory accident of any kind had occurred. The number of schools with accidents decreased by 7% as compared with the survey for 1999/2000. The total number of common accidents decreased from 586 cases to 464 cases (20.8%). The number of cases per school decreased by 16% from 1.31 cases per school to 1.10 cases per school. Most of the cases were minor ones and 94.5% due to carelessness of students. Besides, the number of injuries decreased by 27%. Altogether 358 students and 8 staff suffered injuries.

The two most common accidents, cuts and heat burns/scalds, decreased by 25.3% and 17.6% respectively. The number of accidents due to discomfort arising from inhalation of gases decreased from 11 to 2. A breakdown of the number of cases in different types of reported accidents is given in the **Appendix**. The nature of each type of accident is summarised below.

- (a) **Chemicals on skin:** Many cases occurred as a result of spillage of chemicals during transfer or heating of chemical liquids, opening containers of chemicals or breakage of glass containers. Concentrated sulphuric acid, phenol and dilute acids were the most common chemicals involved. Slight burns or irritations were often resulted. One case was due to a student's misbehaviour of pouring dilute hydrochloric acid to another student.
- (b) **Eye accidents:** Many cases were caused by chemical liquids or solids which splashed onto the eyes, giving rise to slight irritation or discomfort. In a few cases students unintentionally rubbed their eyes with hands contaminated with chemicals.
- (c) **Chemical spillage:** Most cases involved small-scale spillage of chemicals during transfer. Some cases were due to the spillage of mercury from broken mercury thermometers.
- (d) **Heat burns or scalds:** They were mainly caused by carelessness in handling hot objects (e.g. tripods, Bunsen burners, metal rods/plates, test tubes, beakers or combustion spoons), hot liquids, Bunsen flame or lighted matches. Slight heat burns on fingers and palms were most common.

- (e) **Discomfort arising from inhalation of gases:** There were two cases due to inhaling a small amount of gases/vapour.
- (f) **Cuts:** Most cases involved small cuts caused by broken glass apparatus (e.g. test tubes or glass tubing), tools (e.g. dissecting instruments or cutters) or sharp edges. Injuries were mostly found on fingers and palms.
- (g) **Substances catching fire:** Most of the cases were caused by accidental ignition of flammable liquids.
- (h) **Bites by animals:** There was only one reported case. A workman tried to catch a bird fled into the laboratory from outside and carelessly bitten by it.
- (i) **Others:** Some students were hurt when they knocked on the floor or benches or cut by stationery. One case occurred when a pair of Magdeburg hemispheres suddenly broke apart upon pulling by two students.

To better understand the conditions in which accidents occurred, information on the usage of science laboratories in schools was collected for the first time in this survey.

- (a) **Accident rate per 1,000 students:** The schools reported that a total of 325,727 students (S1-7) studied science courses in 2002/03 school year. This corresponded to an accident rate of 1.46 cases\* per 1,000 students studying science courses.
- (b) **Accident rate per 10,000 practical periods:** The schools reported that during 2002/03 school year a total of about 1,316,929 practical periods were conducted (with practical activities e.g. student experiments, teacher demonstrations, preparation for experiments, project work and science club). This corresponded to an accident rate of 3.61 cases per 10,000 practical periods.

\* In 2002, the traffic accident rate in Hong Kong was 2.3 cases per 1,000 population. The industrial accident rate in all industries was 37.4 cases per 1,000 workers.

## Recent Developments on Laboratory Safety

Laboratory safety in schools has always been one of our concerns and it is promoted through the following means in recent years:

- (a) The handbook *Safety in Science Laboratories* was revised to keep up with the latest requirements in school laboratory safety and the way forward in curriculum development of science education. One of the major recommendations is to request all science teachers to carry out risk assessments to identify the potential risks involved in science activities and take appropriate risk control measures in advance.
- (b) A web-based learning package for students “Safety in Exploring Science” was developed (<http://resources.emb.gov.hk/~ses>). The package also includes information regarding the potential risks and safety precautions for experiments and activities suggested in the CDC Syllabus for Science (S1-3).
- (c) A package *Learning and Teaching Resources on Safety in Science Laboratories* was developed to facilitate teachers in planning and conducting lessons on laboratory safety.
- (d) On top of the existing set of 7 posters on laboratory safety and laboratory rules, a new set of 3 posters were published to further promoting students’ awareness of laboratory safety.

- (e) Regular development programmes are organized to inform schools about the latest developments on laboratory safety and to disseminate good laboratory practices. During the 2002/03 school year, 6 sessions of such programmes were conducted. About 500 science panel chairpersons, teachers and laboratory technicians attended these programmes.
- (f) The furniture and equipment lists for new schools were revised regularly. New equipment items e.g. microscale chemistry kits and digital thermometers were included recently as alternatives to minimize the occurrence of laboratory accidents.
- (g) The City University of Hong Kong was commissioned to produce a safety management CD-ROM, entitled “ChemLabels” for schools. The CD-ROM contains safety information about hazardous chemicals commonly used in school laboratories.
- (h) Latest guidelines, circulars and references on laboratory safety are posted on the Internet web site of the Science Education Section (<http://cd.emb.gov.hk/sci>) so that schools can easily access the materials.

### **Concluding Remarks**

Safety is everyone’s responsibility. We need a constant and a concerted effort to maintain the standard of laboratory safety in schools. To maintain a safe learning and working environment, it is necessary for schools to take proactive measures to prevent laboratory accidents especially in promoting awareness of laboratory safety and ensuring students are satisfactorily trained to perform experiments properly and safely. In 1995, the former Education Department advised all secondary schools to set up a standing committee on laboratory safety (SCLS). The SCLS can help promote laboratory safety through closer coordination in reviewing the effectiveness of safety measures to raise the standard of laboratory, and better equip schools to deal with emergency situations. It is therefore important that the SCLS (or relevant safety management committees) of schools could meet regularly and carry out duties to meet these ends.

Schools have maintained a high standard of laboratory safety and shown significant improvement over the years. The surveys on school laboratory accidents have enhanced our understanding of laboratory safety so that appropriate preventive measures can be taken. The latest survey for 2002/03 reveals that there are decreases both in the number of schools with laboratory accidents as well as the number of accidents. The number of common accidents per school also decreased by 16%. The total of 475 cases in 422 schools in a school year corresponds to 1.46 cases per 1,000 students studying science courses and 3.61 cases per 10,000 practical periods. In view of over three hundred thousand students and laboratory staff involved in over one million practical periods in a school year, school have maintained a high standard of laboratory safety. The Science Education Section will continue to promote and to keep track of the standard of laboratory safety in secondary schools. The next survey will be conducted for the 2005/06 school year.

**Science Education Section  
Education and Manpower Bureau  
June 2004**

**Statistics of Surveys on  
Laboratory Accidents in Secondary Schools**

	<b>1999/2000</b>	<b>2002/2003</b>
Number of schools responded	448	422
Number of schools reported laboratory accidents	189 (42%)	148 (35%)
Number of common accidents per school	1.31	1.10
Number of students injured	480	358
Number of staff injured	23	8
Accident rate per 1,000 students studying science courses†	-	1.46
Accident rate per 10,000 practical periods†	-	3.61

<b>Type of accident</b>	<b>Number of cases</b>	
	<b>1999/2000</b>	<b>2002/2003</b>
Chemicals on skin	57	47
Eye accidents	43	33
Chemical spillage	28	30
Heat burns or scalds	216	178
Discomfort arising from inhalation of gases	11	2
Cuts	221	165
Substances catching fire	8	8
Bites by animals	2	1
Subtotal	586	464
Others*	295	11
Total	881	475

*\* In the survey for 1999/2000, over 90% of the cases under this category were mere accidental breakage of glassware or damage of equipment and did not involve any injury. Hence, schools were not required to report mere glass breakage or damage of laboratory equipment which did not involve any personal injuries in the survey for 2002/03.*

*† Reported for the first time in the survey for 2002/03.*