MANAGING HEALTH AND SAFETY IN SCIENCE EDUCATION - A CODE OF PRACTICE

In the secondary school copies of this document should be held by the Biology, Chemistry and Physics Department, the Senior Technician, the Science Technicians and in a central location with suitable access as part of the Master/Subject Safety Files. In the primary school copies of this document should be held by the teacher responsible for Science and in a central location with suitable access as part of the Master/Subject Safety Files.

It is advised that this document and subsequent amendments are put in a suitably labelled ring binder and kept in a prominent place which is known by, and accessible to, all relevant staff. This document, including appendices, must be reviewed and where changes are made they must be recorded below. Where this occurs, out of date material must be removed and discarded to avoid confusion.

Subsequent changes must be recorded below.

Date	Pages removed	Pages inserted	Signed

1. INTRODUCTION

This code of practice is designed to be as comprehensive a guide as possible. It relates directly to the health and safety requirements as laid out in The Health and Safety at Work, etc., Act 1974, Regulations, associated Approved Codes of Practice (ACoPs) and model risk assessments used in science education establishments.

The content of this document supports existing primary and subordinate health and safety legislation. It should be read in conjunction with relevant Acts, Regulations, Approved Codes of Practice (ACoPs) and Guidance Notes. In addition, the Health and Safety Policies of East Dunbartonshire Council and the Community Directorate should be consulted for further information and guidance where appropriate.

The topics and practices contained herein relate to science education environments within schools. Where appropriate, best practice and guidance from industrial environments have been incorporated to ensure, so far as is reasonably practicable, that safety is given the highest priority within this high-risk area of the educational sector.

Teachers and technicians must at all times be aware of their responsibility to maintain a safe environment to ensure their own safety and that of others by their acts or omissions.

2. AIMS

The aim of this document is to ensure, so far as is reasonably practicable, that practices and procedures developed for use within science education are safe and without risk while meeting and exceeding the requirements of current health and safety legislation.

All staff must be aware of and act in accordance with the guidance contained within this document while complying with their responsibilities to the health and safety of themselves and others who may be affected by their acts or omissions.

3. OBJECTIVES

The objectives of this Science Code of Practice are to ensure, so far as is reasonably practicable:

- the health, safety and welfare of all employees of East Dunbartonshire Council involved in the provision of science education
- the health, safety and welfare of those not in the employ of East Dunbartonshire Council, for example pupils and visitors, who may be affected by its undertaking to provide science education
- the maintenance of a safe place of work
- the use of safe systems of work
- adopting the principle of the risk assessment process to identify and control the risk(s) associated with the provision of science education
- the development and use of specific risk assessments to identify and control the risks associated with the use of articles and substances which come under the auspices of the Control of Substances Hazardous to Health (COSHH) Regulations 2002.

- to provide the information, instruction, training and supervision necessary to ensure the health, safety and welfare of all involved in the delivery of science education

- the minimum legislative standards are adopted and, where possible, exceeded within the provision of science education.

4. DUTY OF CARE

It is the duty of all teachers and technicians working in the delivery of science education to:

- so far as is reasonably practicable, take care of themselves and others who may be affected by their acts or their omissions

- be familiar with the content of this document by periodic reference to it and follow the procedures contained therein

- report identified deficiencies to ensure continuous review and to communicate any changes to this document to the Technical Support Service within Resource and Curricular Support.

- co-operate with other members of staff in the promotion and maintenance of health and safety.

5. RESPONSIBILITIES

East Dunbartonshire Council has a duty to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all of their employees, and in particular, as regards:

- the provision and maintenance of plant and systems of work that are safe and without risks to health

- arrangements for ensuring safety in connection with the use, handling, storage and transport of articles and substances

- the provision of such information, instruction, training and supervision as necessary to ensure the health and safety at work of his/her employees

- the maintenance of the workplace in a condition that is safe and without risks to health and the provision and maintenance of means of access and egress are safe and without such risks

- the provision and maintenance of a working environment for employees that is safe, without risk to health and adequate as regards facilities and arrangements for their welfare at work

The person with overall responsibility for health, safety and welfare within all primary, secondary and special schools is the Head Teacher.

In the science departments in secondary schools, this is delegated to the **Principal Teachers for biology, chemistry, physics and science**.

The **Senior Technician** is responsible for the science technicians and any other technician working in the science department with the exception of ICT support technicians.

It should be noted that all members of staff are responsible for their own health, safety and welfare and that of others by their acts or omissions.

6. LEGISLATION

The following Acts and Regulations have been used to inform the contents of this publication.

Health & Safety at Work, etc., Act 1974 (HSW Act)
Management of Health and Safety at Work Regulations 1999 (MHSW)
Control of Substances Hazardous to Health Regulations 2002 (COSHH)
Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)
Electricity at Work Regulations 1989
Noise at Work Regulations 1989
Workplace (Health, Safety and Welfare) Regulations 1992
Provision and Use of Work Equipment Regulations 1998 (PUWER)
Health and Safety (Display Screen Equipment) Regulations 1992
Personal Protective Equipment at Work Regulations 1992
Pressure Systems and Transportable Gas Containers Regulations 2002
Gas Safety (Installations and use) Regulations 1996
Health and Safety (First Aid) Regulations 1981
Manual Handling Operations Regulations 1992
Reporting of Injuries, Diseases & Dangerous Occurrence Regulations 1995 (RIDDOR)
Health & Safety (Safety Signs and Signals) Regulations 1996
Chemicals (Hazard, Information and Packaging for Supply) Regulations 2002 (CHIP)
Ionising Radiation Regulations 1999 (IRR99)
Control of Pollution Act 1974 (CoPA)
Environmental Protection Act 1990 (EPA)
Special Waste Regulations, 1996 (SI No. 972)

These Regulations are constantly being updated and only the most up to date publication should be accessed for reference.

Health and Safety Executive web address http://www.hse.go.uk

7. RISK ASSESSMENTS

The basis of UK Health and Safety Law is the Health and Safety at Work etc Act 1974. The primary act sets out the general duties that employers have towards employees and members of the public, whilst laying out the health and safety responsibilities employees have both to themselves and to others by their acts and/or omissions.

Employers are legally required under The Management of Health and Safety at Work Regulations 1999 to ensure that risk assessments are developed and implemented. The risk assessments are to be carried out by a suitably trained and competent person. A competent person is someone who has the necessary technical skills, knowledge, expertise, training and experience to carry out the risk assessment.

The aim of this Code of Practice, as far as is reasonably practical, is to prevent staff or other persons becoming injured or ill as a result of work activities. A risk assessment is a critical examination of activities to identify the risk(s) to health and safety arising out of, or in connection with, work or the conduct of their undertaking.

The significant findings of the risk assessment are to be recorded on approved East Dunbartonshire Council documentation (See Appendix 5 for Standard form and worked example).

This can include risk assessments undertaken in line with different pieces of legislation such as the Control of Substances Hazardous to Health Regulations 2002 (COSHH) and the Provision and Use of Work Equipment Regulations 1998 (PUWER). Examples are heating water using a tripod and Bunsen burner or heating copper sulphate using a tripod and Bunsen burner. In the first procedure this is a straightforward assessment of the risks associated with hot water, the stability of the tripod, using a naked flame etc. The latter procedure is similar to the first in that the risks associated with the procedure are the same but it is also covered by COSHH legislation in that the hazardous nature of the copper sulphate also has to be taken into consideration.

Some examples where COSHH risk assessments are required:

- experiments using microorganisms
- experiments using hazardous chemicals
- experiments in physics involving the use of a solvent

Some examples of where risk assessments of procedures are required:

- breaking concrete
- use of the laser
- sparking air
- using scalpels

Assistance with other special risks assessments may be obtained in the first instance through East Dunbartonshire Human Resources Health and Safety section.

Risk assessments have to be suitable and sufficient and be exact enough for each particular experiment carried out, for each procedure used in the preparation of chemicals and for the use of equipment. Any changes to experiments and/or procedures will necessitate a reviewed risk assessment.

There are a number of sources of information for risk assessments contained in schools which should always be critically assessed for suitability and validity before use. Examples include SSERC Hazardous Chemicals Manual and SafetyNet, ASE, Chemcord, Challenge Chemistry and those prepared by Local Authorities.

Users need to employ caution when considering risk assessments produced to accompany commercial packages. These should be viewed as a starting point only and not as the finished article. It is the responsibility of the Principal Teacher to ensure that there are up to date risk assessments to accompany each experiment and/or procedure carried out within the department.

All risk assessments must be on East Dunbartonshire Council documentation with any relevant externally produced documentation supporting the risk assessment attached, however the following should always be considered prior to their use:

- externally sourced documentation must be looked at critically to ensure that it is suitable and sufficient for the procedure or experiment in question
- they must be relevant to the task
- they must be able to be applied safely

The Principal Teacher and Senior Technician should ensure that all staff under their control are instructed to utilise the information contained within the aforementioned documents and undertake a monitoring role to validate their effectiveness and use. In addition, the management of health and safety and risk assessment should be a standing item on the agenda for departmental meetings.

All staff need to be familiar with the methods to be adopted for carrying out experimental procedures; ensure that all risk areas have been addressed and that pupils are made aware of the risk control measures associated with each procedure.

Where there is no documentation to support or guide an experiment or procedure, the Principal Teacher must ensure that risk assessments are developed by a competent person based on their knowledge and experience to ensure that the risks associated with these experiments or procedures are controlled.

See Appendix 5

The following steps should be taken to complete a risk assessment:

Step 1 Look for the hazards.

Step 2 Decide who might be harmed and how.

Step 3 Evaluate the risks and decide whether the existing precautions are adequate, or whether more should be done.

Step 4 Record the findings in writing using the agreed standard format.

Step 5 Review the assessment regularly and revise it if necessary.

East Dunbartonshire Council requires its science teachers and technicians to consult specific local restrictions and to use the following texts as sources of preventive and protective control measures which are the results of risk assessments:

- Hazardous Chemicals: A manual for science education, SSERC, 1997
- SafetyNet, SSERC 2006. SSERC website and school network
- Safeguards in the School Laboratory (ASE : 10th Edition, 1996)
- Safety in Microbiology, Code of Practice (SSERC 2002)

Control measures to remove or minimize any risks must be made known, through briefing or training, to all staff, pupils and students. All staff are required to exercise control and supervision to ensure that, as far as is reasonably practicable, such preventive and protective measures are always taken. Holders of promoted posts have the responsibility to monitor and, if necessary, review risk assessments and the preventive or protective measures that result from that review.

Hazard warnings and precautions must be written into materials for use appropriate for learning and teaching schemes e.g. being written into the texts and worksheets used by teachers, technicians and students.

If a teacher or technician cannot find an appropriate risk assessment for a particular operation involving hazardous substances in these texts or an assessment for a very similar one, a new risk assessment must be undertaken. This must be developed by a competent person, based on their knowledge and experience, to ensure that the risks associated with the experiment or procedure is controlled.

Training

The Community Services Department in line with East Dunbartonshire Council's Health and Safety Policy and the requirements of the Health and Safety at Work etc., Act 1974 will ensure, so far as is reasonably practicable, that teachers and technicians receive appropriate training that allows them to undertake their duties in a manner which does not affect their health, safety and welfare or expose them to unnecessary risk.

All Principal Teachers with responsibility for chemistry, physics and biology must be trained in risk assessment. It is recommended that all science teachers and technicians be trained in risk assessment.

Control of Substances Hazardous to Health (COSHH) Regulations 2002

The Control of Substances Hazardous to Health (COSHH) Regulations 2002 lay down the essential requirements for the control of risks associated with hazardous substances and to protect people exposed to them. Failure to comply with the COSHH Regulations constitutes an offence.

The Regulations require risk assessments to be undertaken before employees and others use or produce substances considered as hazardous to health. This will include:

- substances classified under labelling Regulations (CHIP) as being toxic, very toxic, corrosive, harmful, irritant.

- substances assigned an occupational exposure limit (OES) or maximum exposure limit (MEL) including dusts.

- harmful micro-organisms used as part of work under the control of an employer;

It is the Principal Teacher's responsibility to ensure that under the COSHH Regulations:

- all substances deemed to be hazardous are labelled with the correct hazard symbols as defined by the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP) in accordance with UK Regulations and EEC Directives.

- Separate, suitable storage areas are provided for chemicals, flammable liquids and compressed gas. Incompatible hazardous substances should be stored away from each other. HAZCHEM and other safety notices should be displayed on the outside of the store, usually on the doors.

- An up to date inventory of all hazardous substances must be maintained. One copy of this stock list should be kept in the Department and one copy should be kept in the Property Manual which is normally located in the site co-ordinator's room.

- The amount of each substance kept on the premises should be as low as possible consistent with purchasing requirements. Inventories should be regularly reviewed and redundant or out of date stocks disposed of in a safe manner in accordance with Scottish Environment Protection Agency (SEPA) guidelines. Arrangements should be made with the Senior Technician for the uplift of such materials through the Technical Support Centre (See Chemical Uplift, next).

All flammable substances must be stored in a suitable metal cabinet. The cabinet should have a sill capable of retaining 110% of the contents of the largest container. The cabinet should be stored away from other combustible material and sources of ignition. The amount of flammable liquid stored in one area must be kept to the absolute minimum required. The room where flammable substances are kept should be labelled with the COSHH warning label 'Flammable' in accordance with Health and Safety (Safety Signs and Signals) Regulations 1996 and EEC Directives.

Only the minimum quantity of flammable liquids necessary to complete the task in hand should be introduced into the laboratory, technicians' room or prep room.

Teachers and technicians should attend suitable training and refresher training on COSHH Regulations.

Further Guidance

The Control of Substances Hazardous to Health Regulations 2002
ISBN 0 11 082087 8
5 Steps to Risk Assessments
ISBN 0 7176 1565 0
Maintenance, Examination and Testing of Local Exhaust Ventilation (LEV)
ISBN 0 7176 1485 9
Safe use of work equipment, Provision and Use of Work Equipment Regulations 1998
ISBN 0 7176 1626 6
Storage and Use of Highly Flammable Liquids in Educational Establishments.
HSE Leaflet IAC L15
Hazardous Chemicals: A manual for science education, SSERC, 1996
SafetyNet, SSERC 2006. SSERC website and school network
Safeguards in the School Laboratory (ASE: 10th Edition, 1996)
CLEAPSS "Hazcards" (2000 update of 1995 edition available through SSERC).
Code of Practice on safety in microbiology (SSERC 2002)

Reference Agencies and Health and Safety publications *Appendix 3 & 4*

8. CHEMICAL UPLIFT

The Technical Support Adviser will arrange for the uplift and disposal of chemicals by an approved contractor that are unwanted, out of date, beyond their safe shelf life or hazardous. This will be done in conjunction with science technicians, the Senior Technician and the Principal Teachers in the school. The cost of the uplift will require to be met by the individual schools. It is in the interest of the school to ensure that the amount of any chemical bought is kept to a minimum allowing for rapid turnover of stock and avoiding unnecessary waste.

9. FUME CUPBOARDS

The PUWER and COSHH Regulations require the inspection of fume cupboards annually, but Regulations state every 14 months to allow a 'period of grace'. Fume cupboards will undergo inspection by an appointed insurance company whose representatives must be allowed access to carry out the test.

In addition to the above inspection the science technicians will carry out 'challenge tests' on recirculatory fume cupboards annually, or more frequently if necessary, to ensure the filters are working efficiently.

Test Certificates must be kept on the premises in the Statutory Inspection Register (SIR) and be available for staff reference and for inspection by East Dunbartonshire Council's representative and/or Health and Safety Adviser and HM Health & Safety Inspectors. It is the responsibility of the Principal Teacher and the Senior Technician to ensure that the above records are maintained and documented to comply with the above.

Under no circumstances should ducted and recirculatory fume cupboards be used to store chemicals or equipment.

10. PRESSURE VESSELS

Autoclaves, pressure cookers and steam engines need periodic inspection under the Safety of Pressure Systems and Transportable Gas Containers Regulations 2000. They will undergo inspection at predetermined by an appointed insurance company whose representatives must be allowed access to carry out the test.

Copies of the test certificates must be kept on the premises in the Statutory Inspection Register (SIR) and be available for staff reference and for inspection by East Dunbartonshire Council's representative, East Dunbartonshire Council's Health and Safety Advisors and Her Majesty's Inspectors of Health and Safety. It is the responsibility of the Principal Teacher and the Senior Technician to ensure that the above records are maintained and documented to comply with the above.

11. SECURITY

Access to laboratories and stores is at all times to be controlled so as to comply with the risk assessments made under the provisions of the Management of Health and Safety at Work Regulations 1999, the Control of Substances Hazardous to Health Regulations 2002, the Ionising Radiation Regulations 1999 and the Provision and Use of Work Equipment Regulations 1998.

12. WORKING ALONE

In order to prevent staff being exposed to the dangers of working alone on high risk activities they will:

- Inform a member of staff in the nearest appropriate location of their intention to participate in work at activities alone.
- Indicate what activities are to be undertaken and their expected duration.

- Inform the same member of staff when the activities are complete.

- Where possible seek assistance rather than work alone.

- When the completion time has been reached and the member of staff has not been informed that the work has been completed, they should check that the operator is still working safely.

Those in a position of responsibility must ensure that all staff are aware of the precautions to be taken when working alone.

Further Guidance
Working Alone in Safety
ISBN 0 7176 1507 3
Health and Safety Standard on Lone Working No. HC/HS/STD/018
East Dunbartonshire Council

13. PERSONAL PROTECTIVE EQUIPMENT (PPE) AT WORK REGULATIONS 1992

Prior to the issue for use of personal protective equipment, a suitable and sufficient assessment of the risks should be made to determine the suitability of the PPE required. Personal protective equipment must be readily available, properly stored, used and disposed of as appropriate. Where required, training in its use may need to be given. In secondary schools it is the responsibility of the Principal Teachers to ensure that this is done, in primary schools this will be the responsibility of the Head Teacher.

It is the Senior Technician's responsibility to ensure that PPE used by the technicians is readily available, properly stored, used and disposed of as appropriate.

Employees should examine PPE before it is worn to ensure that it is in good working order. Before PPE is issued to and used by pupils, the teacher should examine it to ensure it is in good working order.

Information on the East Dunbartonshire Council policy on PPE can be found in circular MSF/34e

Eye protection

Indirectly vented goggles of the appropriate British Standard must be used whenever chemicals are being used in East Dunbartonshire Schools.

Goggles should be in good condition and able to be adjusted to fit snugly on the face. Consideration should be given to buying sets of smaller goggles for use by younger pupils. Goggles with scratched lenses that impair vision, lenses that have become detached from the frame or where the indirect vents are missing must not be used.

A face shield must be used when dispensing large volumes of corrosives or opening a bottle whose contents may be under pressure. Where eye protection is being used to protect against flying objects, it must be impact resistant.

For information and purchasing advice see Appendix 7

Gloves

An appropriate risk assessment will determine whether or not gloves are required. Where it has been determined that they are required they must be suitable and sufficient for the type of activity and chemical being used. The CE label will give some brief information, but the glove manufacturer's data is more useful. A summary of the particular glove types needed for safely handling a range of chemicals can be found in Section 11, Resistance of Gloves to Chemicals, Hazardous Chemicals, A Manual for Science Education, SSERC, November 1997.

It should be noted that latex gloves, either powdered or non powdered, must not be used by East Dunbartonshire Council personnel under any circumstances.

Further Guidance
The Personal Protective Equipment at Work Regulations 1992
Hazardous Chemicals, A Manual for Science Education, SSERC, November 1997
SafetyNet, SSERC 2006, SSERC website and school network
East Dunbartonshire Council Health and Safety Bulletin 03/06 Latex Gloves

14. EQUIPMENT IN GENERAL

All staff responsible for selecting equipment for purchase must check, as far as is practicable, that it will be safe in use and suitable to the intended purpose (Provision and Use of Work Equipment Regulations 1998). Equipment listed by reputable, specialist educational equipment suppliers can generally be taken to comply especially where a relevant and appropriate British Standard or European Standard is quoted. Other equipment, such as that purchased from ordinary retail or High Street outlets or, especially, gifts must be treated with a sensible degree of caution and carefully assessed. The Technical Support Centre and SSERC can often provide advice.

Where equipment is donated or gifted to the school it must undergo a rigorous examination either mechanically or electrically to meet the requirements of the PUWER Regulations, the Electricity at Work Regulations and East Dunbartonshire Council's policy on portable appliance testing.

From 1st January 1997 it became necessary that existing equipment also be assessed and its suitability confirmed. Particular attention is to be paid to equipment with moving parts, be able to cause burns or scalds or capable of shock risk voltages on accessible parts. The use of some types of equipment may have to be restricted to those users who have had, or are given, special training.

Any user who discovers a defect in any item of equipment must report it to their line manager who is in turn responsible for withdrawing the item from service until the defect is rectified or a suitable replacement item is purchased or otherwise provided.

15. MANUAL HANDLING

All operations involving lifting, carrying or accessing items in storage, handling materials in bulk or of awkward dimensions etc. are to be assessed to ascertain the risks of injury (Manual Handling Operations Regulations 1992). Risk assessments should be reviewed at predetermined frequencies to ascertain their continued validity.

16. ELECTRICAL TESTING

To meet, support and exceed the requirements of the Electricity at Work Regulations 1989, East Dunbartonshire Council has in place a portable appliance testing regime that covers all items of portable equipment. The technicians, delegated to do so by the Senior Technician, will carry out this PAT testing. The results will be electronically logged.

Hard copies of the test results will be kept in the Statutory Inspection Register and be available for staff reference and for inspection by the East Dunbartonshire Council's representative or Health and Safety Inspectors. A copy of the printouts will be held at the Technical Support Centre.

In addition East Dunbartonshire Council officers carry out fixed installation testing at predetermined frequencies to ensure the integrity of systems. They must be allowed access to carry out the test.

Further Guidance
Electrical Safety in Schools
ISBN 0 11 883 567 X
The Safe Use of Portable Apparatus
ISBN 0 11 883 563 7
Memorandum of Guidance on the Electricity at Work Regulations
ISBN 0 11 883 963 2

17. LOCAL ARRANGEMENTS AND REQUIREMENTS

The Management of Health and Safety at Work Regulations 1999 places a duty on employers to have in place systems that deal effectively with emergencies or conditions of serious or imminent danger. All members of staff have a legal duty to co-operate with East Dunbartonshire Council in their implementation.

Staff should ensure that they are aware of the procedures and where required ensure that pupils under their control are informed. Where deficiencies are identified they should be reported and effectively controlled.

Emergency procedures

Staff must be familiar with the location in each work area of the fire or other emergency evacuation route, fire-fighting equipment, the nearest first aid box, the mains water stopcock, the main gas stopcock, the main electricity isolation switch and all personal protective equipment (PPE).

First aid

All staff should make themselves aware of East Dunbartonshire Council procedures for dealing with accidents and incidents. Information on how to contact first aiders should be posted beside every phone in the Department. Every Science Department should hold a first aid box and every room in the Department should have clear instructions on the names and contact numbers of first aiders and the location of the First Aid Box. Staff should also be aware of when it would be appropriate to call an ambulance immediately. For example, when:

- The casualty is unconscious.
- There is a head injury with associated disorientation, sickness and/or dizziness.
- There is a head injury with fluid oozing from the ear.
- There is an object embedded in, or a penetration wound to, the eye.
- There is a penetration wound to the ear.
- There is a deep penetration wound to the body.
- The casualty is suffering a prolonged asthmatic attack

In addition, to reduce to a minimum the personal injury effects of any accident, there are a number of immediate remedial measures that all science staff should be aware of. For example, if there has been a splash of alkali in the eye, immediate and prolonged irrigation of the eye is required.
Details of immediate remedial measures can be found on Page 30 of Hazardous Chemicals, A Manual for Science Education, SSERC, November 1997.

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995

In the event of an accident or incident occurring in the department, East Dunbartonshire Council's current guidelines on accident reporting must be followed and the completion of a PER (HS1a) form is necessary for every incident.

It is the responsibility of the injured person's line manager/supervisor to ensure that all relevant forms are completed in the event of an accident or incident in the Department. It is also the responsibility of the injured person's line manager/supervisor to investigate every incident/accident to determine the basic and/or underlying cause. As a result of the investigation, measures identified to prevent a recurrence should be entered in Section 7 of the reporting form PER (HS1a). In the event of a pupil being injured as the result of an accident it is the responsibility of the class teacher or designated member of office staff to complete the necessary documentation.

Reference
East Dunbartonshire Council Health and Safety Arrangements for the Reporting of Accidents, Injuries, Diseases, and Dangerous Occurrences. Revised June 2004.
Hazard*ous Chemicals, A Manual for Science Education, SSERC, November 1997*

Fire

All members of staff and pupils must be made aware of the evacuation procedures in the event of a fire or emergency. Each establishment should carry out emergency/fire drills shall be conducted in every school term with the day, date and time logged in the Fire Record Book. Science department staff must follow normal school procedures in case of fire. However, all staff must be made aware of the extra fire hazards that may occur in the department and what remedial measures should be taken in the event of an incident.

A copy of the Fire Evacuation Procedures must be displayed in a prominent position in every classroom and workroom in the department.

Further Guidance
Fire Precautions in the Workplace; Information for Employers about the Fire Precautions, Workplace Regulations 1997
ISBN 0 11341169 3

Gross spillages, release of harmful flammable gases or vapours etc.

The possibility of such incidents must be anticipated and their varied consequences planned for so as to minimise any damage or harm to either persons or premises. For example where a large quantity of a hazardous chemical such as 880 Ammonia has been involved it would be necessary to evacuate the lab and to call the emergency services. Emergency telephone contact numbers should be displayed close to each science department telephone extension.

Emergency contact telephone numbers

The following list of numbers should be prominently displayed close to every telephone in the Science Department:

FIRST AID CONTACTS IN SCHOOL

Name	Ext No

HEALTH AND SAFETY ADVISER		
Tom Brown	0141 578 8114	0776 8032421
CHEMICAL SPILLAGE		
SSERC	01383 626070	
PT Chemistry School Ext		
MICROBIOLOGICAL SPILLAGE		
SSERC	01383 626070	
RADIOLOGICAL INCIDENT		
Jim Jamieson (RPA)	01383 626070	
Royal Infirmary (for adults)	0141 211 4000	
Ask for Duty Medical Physicist		
or		
Royal Hospital for Sick Children	0141 201 0000	
(for children under 14)		
Ask for Duty Medical Physicist		

18. DEPARTMENT RULES AND CHECKLISTS

The Guidelines for Science Staff are contained in Appendix 11 and 12 and the Rules for Pupils in Appendix 13. Safety Rules for Pupils *(Appendix 13)* is to be posted on the wall in all teaching areas.

Further Guidance

Guidelines for All Staff	*Appendix 11*
Guidelines for Teachers	*Appendix 12*
Safety Rules for Pupils	*Appendix 13*

19. COMMUNICATIONS

In secondary schools the Principal Teachers are responsible for issuing this document, ensuring as far as is practicable that is read, briefed and implemented by the teaching and support staff who may be affected by its contents, and that all staff know where it is kept. In primary schools this will be the Head Teacher's responsibility to communicate this information and ensure its implementation.

The Principal Teacher/ Head Teacher must draw attention to any amendment(s) made to the Code of Practice by them or by the East Dunbartonshire Council and, for their own protection, record that this has been done. Departments are advised to have a procedure whereby hazards etc. of which any staff become aware from other reputable and relevant sources, are brought to the attention of everyone in the department or school.

Everyone must make sure that all delegated responsibilities are carried out and that any damage to equipment, which may produce a hazard, is properly reported; they may have to ban the use of such items or require that extra precautions be taken until repairs are complete.
It is sensible for safety to be a regular item on the agenda of staff meetings and for technicians to attend meetings when it is discussed.

Staff should discuss their development needs with their line manager. This allows for the appropriate means whereby those needs are to be met to be established. It is the responsibility of the school's senior management team to arrange for relevant and appropriate health and safety training. Within secondary schools health and safety should be a standing item on the agenda of departmental meetings. Similarly in primary schools, health and safety should be a standing item on the agenda of staff meetings.

20. RECOMMENDED PROCEDURES - GENERAL

Services

- The main control switches, stopcocks and valves for electricity, gas and water supplies servicing a science area should be correctly identified, isolated or switched off when not in use.

- Staff should know the location of the mains water supply stopcock and how to operate it.

- Staff should know the location of the main controls/valves to the electrical/gas supply and how to operate them.

- Ensure that supply cables or tubing are not in a position where they are liable to be damaged.

- Any damage to fixed pipes, conduit or sockets should be reported immediately; any equipment should be disconnected from the supply and the damaged service clearly labelled as unsafe.

- Residual current devices should be checked using the test button in accordance with the manufacturers' recommendations.

Laboratory fittings and fixtures

The following items must be readily available in each science teaching area:

- Suitable, operational fire fighting equipment.
- A waste bin for general/paper waste
- A waste bin for broken or unwanted glass

The following items must be available within science departments:

- Safety Screen(s)
- A brush and shovel.
- Chemical Spillage kit
- Microbiology Spillage kit
- A suitably equipped first aid kit – MSF/12.

General points

- Ensure that the general work environment is, so far as is reasonably practicable, safe and tidy.
- Floors should be kept in good repair and any defects reported.
- Pupils must be supervised at all times whilst in science teaching areas – MSF/5 p6.
- Floors, shelves and benches in teaching areas should be kept free of equipment and substances that are not required for current use.
- All equipment and substances should be stored safely. Provision should be made for the safe accessing of all stored materials.
- Faults or defects in apparatus, equipment or service outlets should be dealt with in accordance with the instructions contained in MSF/5 paragraphs 15 and 16.
- Each teaching area must have clearly displayed a concise set of general safety guidelines - Appendix 13. Relevant safety signs appropriate to specific hazards and conforming to the Safety Signs Regulations should also be clearly displayed.
- All safety signs must comply with The Health and Safety (Safety Signs and Signals) Regulations 1996.
- Ensure that personal protective equipment (PPE) is readily available, properly stored and used as appropriate. All PPE should conform to relevant British and European Standards.

- Goggles that provide protection from liquid splashes are the normal form of eye protection. Eye protection should conform to EN 166 B (BSEN 166 B) or BS2092 - 1CDM. It should be noted that persons who normally wear spectacles might find difficulty in wearing goggles over their spectacles; in such circumstances a face shield should be used which should conform to BS2092 – 1CM. MSF/34e. See Appendix 7.

- Latex gloves, either powdered or non-powdered, must not be used by East Dunbartonshire Council personnel under any circumstances. Health and Safety Bulletin 03/06

- All spillages should be cleaned up immediately in accordance with the manufacturers' data sheets and COSHH assessments. Personnel clearing the spillage must wear appropriate personal protective equipment.

- Keep all passageways and exits clear with safe working distances between benches.

- Ensure that fire exits are operational, clearly marked, easily opened and unobstructed at all times.

- Sharp objects should not project from benches.

- All chemicals and equipment should be safely stored when not in use.

- Reagent bottles should be stored where they are not subjected to direct sunlight to prevent the danger of pressure build up or the bottle acting as a lens to focus the sun.

- All teaching areas and prep areas should have a glass Winchester, suitably and clearly labelled, designated for organic waste. No organic waste or solvent should be disposed of via the sink traps; such material should be disposed of into the organic waste bottle. Particular care should be taken in the siting of organic waste bottles to prevent a build up of pressure.

- Long hair must be tied back, loose items of jewellery removed and loose items of clothing fastened to prevent risk of entanglement or contact with chemicals or naked flame. GSF/15.

- Staff must ensure that a high standard of behaviour is maintained in all science areas.

- Flammable substances and hazardous chemicals should only be used in accordance with the COSHH regulations and assessments.

- Teachers should be proactive in demonstrating to pupils the safe methods of handling equipment and chemicals as well as indicating associated risks and the measures necessary to counter these risks.

- All materials and substances should be used in accordance with the manufacturers' instructions and data sheets.

- Hot materials should be placed in a safe area and should be signed 'DANGER HOT'.

- Teaching areas should be checked for potential dangers after a class has left.

- Ensure that all accidents/incidents are reported in accordance with East Dunbartonshire Council's accident reporting procedure.

- It is imperative that teachers are made aware of any medical information, including allergies, concerning pupils that are relevant to the activities being undertaken by them.

- A first aid box should be readily available in the department. MSF/12, SSF/T17 and Health and Safety (First Aid) Regulations 1981.

References

Master Safety File (MSF)	*Strathclyde Regional Council*
Subject Safety File/Science (SSF/S)	*Strathclyde Regional Council*
General Safety File (GSF)	*Strathclyde Regional Council*
COSHH Safety File (COSHH)	*Strathclyde Regional Council*

Electricity and electrical appliances

- All portable appliances using mains power shall be formally tested, at least annually by the technicians. Furthermore, the equipment should always be visually inspected for defects by technicians before issue and by the teacher before issue to pupils. – see SSF/S26.

- Adaptors which enable more than one piece of equipment to be plugged into one socket must not be used – MSF/20(a). Fused multiblocks can be used but care should be taken that the combined load of appliances does not exceed the fuse rating of the multiblock.

- The use of extension leads should, where possible, be avoided – MSF/20(a).

- Temporary connections or open-knife switches must not be used with voltages in excess of 25 volts dc or 35 volts ac.

- On all electrical equipment operating at voltages in excess of 25 volts dc or 35 volts ac shrouded plugs and shrouded sockets must be used. This will include HT, EHT supplies, Teltron tubes, meters, electrophoresis kits. *Ref: SSERC Bulletin 208*

- Electrical apparatus must be switched off prior to relocation.

- Privately obtained new or second hand electrical equipment must be inspected and tested before use in educational establishments – MSF/20(1).

- To avoid the risk of electrocution care must be taken at all times where electrical appliances, including computers, are being used in laboratories close to water or other liquids.

- Only authorised staff may undertake the investigation and repair of faults in electrical appliances – GSF/14(a) and GSF/14(b).

- Advice on the use of electricity and electrical appliances in primary schools can be found in 'Be Safe' Third Edition, the Association for Science Education, Chapter 10

21. RECOMMENDED PROCEDURES – MAINLY PHYSICS

Radioactive sources

A set of papers on different aspects of health and safety guidance have been placed on the SSERC website for downloading.

http://www.sserc.org.uk/members/SafetyNet/Radioactivity/Main_Menu.htm

These are tabulated below.

	Document name	**Comment**
1	Working with radioactivity: What you should know and do	Poster to be placed on display on Physics Department notice boards
2	Working with radioactive substances: Record and management list	Pro forma on which school records should be kept; it includes a management check list for use by the PT Physics
3	Risk assessment: Use in schools of sealed radioactive sources	Includes a set of working procedures to control risks
4	Contingency plans	Planning for unusual occurrences
5	Protocol on the ageing and leak testing of sealed radioactive sources	Includes details of leak testing sources
6	Leak test analysis	Excel file for analysing leak test results
7	Radioactive source storage	With best practice on storage
8	Radiological protection in schools: Training needs	Guidance for Councils and teachers on training needs

Please note that all of the long-established documents have been revised and rewritten. Others (3, 4, 7 & 8) are new.

An article titled Safety Guidance on Radioactivity was published in the SSERC, Science and Technology Bulletin 211. It provides an overview of the advice contained in the above documents. The three main points are:

1. The protactinium generator should be withdrawn from service forthwith and kept safely in secure storage in schools until arrangements for its disposal are made by SSERC (see paragraph below item 3).

2. There is a legal requirement to have in place a set of contingency plans for work with ionising radiations in schools. These have been revised and expanded from the published Explanatory Notes of 1987.

3. There is a general need to dispose of aged sources, particularly
   a) The protactinium generator
   b) Orphan sources (uranium and thorium compounds)
   c) Radium sources

SSERC is currently making arrangements for the disposal of redundant radioactive materials held by schools. The matter is complex SSERC will notify East Dunbartonshire Council when these arrangements are in place.

Once arrangements have been made with SSERC, details of training on radiological protection for any teacher handling radioactive materials will be available through the on-line staff development catalogue.

East Dunbartonshire Council's Radiation Protection Adviser (RPA) is:

Jim Jamieson
Senior Associate
Science Technology and Safety
SSERC
2 Pitreavie Court,
South Pitreavie Business Park
Dunfermline
KY11 8UB
Tel: 01383 626070
psa@sserc.org.uk

East Dunbartonshire Council's Health and Safety Adviser is:

Tom Brown
Health and Safety Adviser
Tel: 0141 574 5626
tom.brown@eastdunbarton.gov.uk

East Dunbartonshire Council's local manager is:

Eileen Lister
Team Leader - Technician Service
Tel: 0141 578 8727
eileen.lister@eastdunbarton.gov.uk

In the event of a radiological incident:

Jim Jamieson (RPA)	01383 626070
Royal Infirmary (for adults and pupils over 14 years) Ask for Duty Medical Physicist	0141 211 4000
or	
Royal Hospital for Sick Children (for pupils under 14 years) Ask for Duty Medical Physicist	0141 201 0000

The staff member responsible for radiological protection in the school is:

Optics and optical equipment

- The sun or any other intense source of light must not be viewed directly or through an optical instrument capable of concentrating light on the retina of the eye.

- Suitable filters or eye protectors should be used in the presence of strong ultra-violet radiation.

- Adequate ventilation is necessary in operations involving ultra-violet radiation – see Topics in Safety p8.

- Care must be taken when using stroboscopes. Some pupils are susceptible to photo induced epilepsy and care should be taken within the range 10-25 hertz.

- When using lasers the safety rules contained in the Scottish Education Department (SED) Circular No 766 and the guidance in the SSERC Bulletin 176 should be followed – SSF/S16.

- Impact resistant eye protectors should be worn during experiments involving carbon filament lamps.

Electricity

- Where HT supplies are being used shrouded sockets must be fitted, shrouded terminals must be fitted on the apparatus and shrouded leads must be used at all times. Pupils under 16 years or S5 must not work with HT supplies and HT supplies must have a warning label attached. All Teltron tubes must be fitted with shrouded connectors.
  Further information: SSERC bulletin 208

- When using the Van de Graaff generator in schools the following rules should be applied:

  i) Teachers should receive necessary training on how to use the Van de Graaff safely.
  ii) Before using the equipment the teacher should check the school records for any relevant medical condition and warn the class that it should not be used by anyone with such conditions. Pupils with cardiac conditions such as coronary heart disease (e.g. angina, history of heart attack), cardiac rhythm disorders, intra-cardiac conduction pathway anomalies, presence of implanted cardiac pacemaker, hypertension or epileptic subjects should not receive electrical discharges from Van de Graaff generators.
  iii) The maximum diameter of dome should not exceed 25 cm.
  iv) Only one pupil at a time should be charged to limit the charged capacitance of the system.
  v) Only volunteers should participate.
  vi) Never let someone touch a charged dome, and then walk away.
  vii) The dome should always be discharged immediately after every operation.

  Further information: SSERC Bulletin 205 Summer 2002

- Wiring plugs should only be carried out in classrooms where the sockets can be isolated by the teacher for the duration of the exercise.

Forces

- Appropriate safety precautions should be taken when testing materials. Consideration should be given to the need for appropriate impact resistant eye protection.

- When testing or using heavy objects, a box containing soft material should be placed under the object to cushion the fall.

- Be aware of the dangers of using or testing flying objects e.g. launching/dropping experiments, spinning disks, catapults.

- If launching helium balloons the local airport must be notified.

22. RECOMMENDED PROCEDURES – MAINLY BIOLOGY

Materials of living origin

Staff must adhere to the guidance contained in *Materials of Living Origin, A Code of Practice for Scottish Schools, SSERC 2nd Edition 2005*.

Microbiology and biotechnology

Staff must adhere to the guidance in *Biology/Biotechnology, Safety in Microbiology, A Code of Practice for Scottish Schools and Colleges, SSERC 2002*.

- Any school wishing to carry out Level 2 work must have staff trained to Level 3 to carry out the appropriate work as detailed in *Biology/Biotechnology, Safety in Microbiology, a Code of Practice for Scottish Schools and Colleges, SSERC 2002*.

- All science technicians, Principal Teachers with responsibility for biology and one other biology teacher in each secondary school must be trained to Level 3. In addition, it is recommended that all biology teachers are trained to Level 3.

- It is recommended that staff attend a one day refresher course every 5 years or a two day refresher course if ten years has elapsed from the time of their last training.

- The guidance contained in *Be Safe, Chapter 14, the Association for Science Education, Third Edition* must be adhered to for work in primary schools.

Environmental, field work and farm visits

- Staff organising these activities must follow the standards set out the EDC policy, Educational Excursions & off site Activities. This code of practice includes information on staff ratios, risk assessments, transport and planning.

- The site and activities involved in environmental sampling, field work and farm visits must be chosen carefully taking into account the possibility of contamination such as dog fouling, rat urine, animal ticks and consequent infection e.g. Toxicara and Leptospirosis (Weil's disease), Lymes disease & E Coli. Normal good hygiene practice should be adopted and protective clothing such as gloves used where appropriate. Hand washing must take place after all contact with animals.

- Pupils must be effectively supervised whenever they are working outdoors, taking account of environmental conditions and extra care should be taken around ponds or other bodies of water. Some field work taking place in remote settings may be covered by the EDC policy, Outdoor Learning & Adventurers Activities: A Code of Practice.

- The organisation The Royal Highland Education Trust (RHET) produces a booklet containing detailed advice 'Guidelines for Farm Visits'. RHET can also arrange visits to carefully selected farms within the local area which have been audited and prepared to make them suitable for school visits.

- Staff can contact the Educational Visits Officer for further advice (0141 578 8930).

Royal Highland Educational Trust
Royal Highland Centre
Ingliston,
Edinburgh, EH28 8NF
Tel: 0131 335 6227
www.rhet.org.uk

Electrophoresis

- Electrophoresis kits must not be used with supply voltages above 25 volts unless the sockets and leads on the apparatus are shrouded.

- Always use specifically designed apparatus which prevents contact with the electrolyte or exposed connections. Improvised equipment must never be used to carry out electrophoresis.

References
Materials of Living Origin, A Code of Practice for Scottish Schools, SSERC 2nd Edition 2005
Biology/Biotechnology, Safety in Microbiology, a Code of Practice for Scottish Schools and Colleges, SSERC 2002
Be Safe, Third Edition, Association for Science Education
Electrical Safety: Working with HT Supplies, SSERC Bulletin 208

23. RECOMMENDED PROCEDURES – MAINLY CHEMISTRY

Banned Chemicals in East Dunbartonshire Council

The following chemicals must not be used in East Dunbartonshire Council schools under any circumstances. If a chemical is not listed below it does not imply that it is safe. Risk assessments must be in place for all procedures involving hazardous chemicals.

Asbestos containing materials
Alkyl sulphates
Phenylamines and their salts e.g. 4-aminodiphenyl
4-nitrodiphenyl
Benzene or anything containing more that 0.1% benzene
Crude oil
Petrol
Benzidine and its salts
Biphenyl substituted by

i) at least one nitro or primary amino group, or by at least one nitro or primary amino group
ii) further substitution by halogeno, methyl or methoxyl groups but not by other groups in addition to substitution as in i) above.

Carbon disulphide
Chloroethene (vinyl chloride monomer)
1,2-dibromoethane
1,2-dichloroethane
Ethylene dibromide
Ethylene dichloride
Hydrazine
Iodomethane (methyliodide)
Isocyanates
Methanal (formaldehyde)
2-naphthylamine (2-naphthalene-2-amine) and its salts
Phenol
Picric acid
Naphthalen-1-amine or Naphthalen-2-amine (alpha- or β-naphthylamine)
Naphthylbiphenylazo dyes in general
Nitrosamines
N-nitroso compounds should not be prepared (Avoid accidental preparation)
Nitrosophenols
Nitronaphthalenes
Trichloroethene (trichloroethylene)
Tetrachloromethane (carbon tetrachloride)

This list of banned chemicals has been reproduced in Appendix 2 in order that it can be more easily copied.

Chemical substances

- Head Teachers in primary schools have responsibility for selecting chemicals for use in their establishment. Guidance should be taken from the document 'Be Safe'.

- Teachers and technicians must be aware of the special methods and hazards involved in the use, handling, storage and transportation of chemicals. Head Teachers and Principal Teachers of science subjects are responsible for ensuring that all relevant information issued is readily available to all staff. This should include details of risk assessments and resultant controls.

- Substitute ceramic fibre wherever possible using a less hazardous replacement, possibly by the Superwools or, better still, by drawn glass filaments. Substitute rockwool and slagwool by drawn glass filaments. Where no alternative is available for a particular application, ceramic fibre wool should be used carefully. Heat resistant mats should always be replaced immediately if broken or fraying. Replace damaged ceramic centred gauzes immediately and have a rolling programme to replace sound ones with stainless steel, non-centred gauzes.
  Reference: SSERC Bulletins 206, 189 and 187

Storage

- Substances must be stored in such a way as to minimise possible hazards and in quantities which ensure a fairly rapid turnover of stock. Deliberate limiting of stock will assist in keeping storage problems to a minimum.

- Each school must keep an up to date stock list of all chemicals held. Stock lists should contain name, type, amount, storage location and annual usage etc. Stock lists should be updated as and when required and at least annually. New stock must always be date stamped on receipt.

- All containers must be clearly labelled and carry appropriate hazard warning label(s). Major storage areas should be clearly marked with the appropriate safety sign(s).

- Access to storage areas shall be restricted to authorised persons only. Storage area door(s) should be locked and labelled with the prohibition sign "NO UNAUTHORISED PERSONS ALLOWED BEYOND THIS POINT".

- Special provision must be given to the storage of toxic chemicals. Consideration should be given to the storage of toxic chemicals within storage areas where entry can be restricted to one securely locked door. Where toxic cabinets are in use, the cabinet must be kept secure at all times. Appropriate signs must be displayed on the cabinet and storeroom door.

- Flammable chemicals must either be stored within specially designed flammable liquid stores or if in a general storage area, within lockable flammable liquid cabinets.
  (i) The amount of flammable liquids stored in any place must be kept to the absolute minimum required.

  (ii) Flammable liquid cabinets must display a 'flammable' warning sign on the door panel.

(iii) The room where flammable substances are kept should be labelled 'flammable' on the entrance door

(iv) Flammable liquids stores and cabinets must be kept locked at all times and keys removed immediately after use. Keys should not be stored where they can be easily accessed by unauthorised persons.

(v) Stocks should be kept to the minimum required.

(vi) No container of flammable liquid greater than 500 ml is allowed in any laboratory.

(vii) Flammable liquids should be returned to secure storage immediately after use.

- Safe storage and handling facilities for compressed gas cylinders must be used at all times.

(i) Cylinders must be stored and transported in the trolleys provided for this purpose.

(ii) Entry door(s) to storage area(s) must display "Compressed Gases" safety signs.

(iii) For ease of handling, only cylinders type F or cylinders of an equivalent size and design should be held within schools.

(iv) Cylinders should not be stored within chemical stores or in classrooms.

(v) Access to cylinder keys should be restricted to authorised staff.

(vi) Sulphur Dioxide cylinders must not be stored beside corrosive substances nor should they be stored in labs or fume cupboards. Particular care must be taken in their use due to the toxicity of the gas.
Ref: SSERC Hazardous Chemicals, a Manual for Science Education, Nov 1997

(vii) the condition of the gas cylinder and valve must be checked at least once per term and immediately before use.

(viii) Leak tests should be carried out annually or if there is reason to suspect a leak.

(ix) Gas cylinder regulators should be professionally checked every 5 or 6 years. Regulators older than 20 years should be replaced. Such regulators may be marked BS5741, or have no BS marking at all. Younger regulators will be marked BS EN 585 or BS 7650 and those purchased since 1998 carry the mark BS EN ISO 2503.

Reference: Gas cylinders and regulators, SSERC Bulletin 205

- Bottles of alkali metals and bottles containing phosphorous should be stored within sturdy compartmentalised containers to ensure that the bottle remains upright. Both the bottle and metal container should be clearly labelled with the name of the substance, name of the immersion liquid to be used (if appropriate) and either a "water reactive" or "air reactive" warning sign, whichever is appropriate. Immersion liquid levels should be checked at least once per term and immediately before issue.

- Care must be taken when transporting substances to and from storage areas. Winchester and bottle carriers must be used at all times.

- Containers of corrosive substances should be stored at low levels, placed in containment trays and kept separate from flammable substances. Where substances are stored at floor level a "kick board" must be fitted to prevent accidental damage and resultant spillage.

- Shelving units within the department should be checked annually for signs of damage or corrosion.

- Stores should be sited to take account of security arrangements and transportation considerations.

- Oxidising agents should be stored separately from combustible materials. Separate storage could consist of separate areas within the one store.

- To avoid risk of explosion, organic chemicals, including organic waste bottles, must not be stored where they are subjected to exposure to strong sunlight or high temperatures.

Use of chemicals

- All containers of chemicals must be clearly and appropriately labelled in accordance with the COSHH Regulations.

- Before a pupil is allowed to handle chemicals; the teacher must ensure that the pupil is aware of the specific hazards associated with the chemical(s) and the experimental procedure(s).

- Personal protective equipment must be used as required.

- Pupils must not be given chemicals to take home.

- Principal Teachers of the sciences will have the responsibility of selecting chemicals for use within the science departments ensuring that no chemical from the Banned Chemical List published by East Dunbartonshire Council is used. The decision to adopt any chemical must be taken having regard to any hazards involved in use, storage, handling and transportation compared with the educational value of using the chemical concerned. Chemicals must only be obtained from accredited suppliers.

- Containers must be opened with care especially if they contain volatile or corrosive substances.

- Stoppers should be replaced immediately and the container returned to its proper storage area. Unused chemicals should not be returned to stock bottles. Bottles must not be left standing at or near the edge of benching.

- Bromine held within schools must be kept to a minimum and only in the form of 1 ml or 2.5 ml capsules.

Spillage and disposal

- Chemical spillages should be approached with caution. Where a large quantity of a hazardous chemical such as 880 Ammonia has been involved it may be necessary to call in the emergency services to deal with the spill. In this particular case the room should be evacuated immediately.

- Chemical spillage kits and protective equipment should be available and used as appropriate. For information on the contents of a Spills Kit see Appendix 10.

- Chemicals should be disposed of following the practice outlined by East Dunbartonshire Council instructions. See Chemical Uplift section of this document.

24. RECOMMENDED PROCEDURES - PRIMARY SCHOOLS

It is recommended that this whole document should be read and enacted by Head Teachers and all teachers undertaking science work in the primary school, paying particular attention to the points specific to the primary sector.

General points

- Health and safety should permeate the teaching of science and should not be taught as a discrete subject.

- Pupils must be taught to recognise the general hazard warning sign and other internationally used hazard warning symbols as appropriate.

- All pupils should be given clear guidance, rules and boundaries and be encouraged to think through the various consequences of different choices, decisions and courses of action.

- Teachers must always model good practice as well as insisting that pupils follow their example.

- Teachers must always consider the maturity and experience of all those participating when planning activities and plan activities, instructions, precautions and the level of supervision provided accordingly.

Using glass

- Avoid the use of glass by younger or less reliable pupils

- Avoid the use of glass if satisfactory, safer alternatives are known to exist e.g. plastic mirrors, suitable plastic containers.

- Where the use of glass is unavoidable teach the pupils how to handle it safely.

- Where glass is being used, be prepared for breakages by ensuring that everybody knows what they should and should not do when breakages occur.

- Containers manufactured from normal glass or ceramic are likely to shatter if hot water is poured into them. Such containers should never be used for heating substances or for transporting hot liquids. Glassware such as ovenware, laboratory Pyrex, or metal containers should be used and are available from reputable suppliers.

- Thin walled plastic containers are likely to soften or collapse if used to hold hot water. Lightweight containers may fall over too easily.

- Never put unwrapped broken glass in any bin. Wrap in thick layers of newspaper and place directly into the refuse. It is recommended that 'broken glass' bins are made available to staff and pupils.

Heating and burning

- All such activities require close adult supervision at all times.

- If using nightlights or candles they should be placed on a layer of sand in a large metal tray. Nightlights tend to be more stable than candles and their use is preferable; if candles have to be used they should be supported in a suitable stable holder.

- Hot water is best taken from the tap. If very hot water is needed an adult should carry it in a closed container such as a kettle or Thermos flask.

- Sources of heat which are not recommended include (but not exhaustively) spirit burners, oil lamps, picnic stoves, portable bottled gas burners and hot air paint strippers.

- Plastics, synthetic fibres and fabrics may give off hazardous fumes when burned. These materials should not be burned.

Forces

- Appropriate safety precautions should be taken when testing materials. Suitable eye protection may be required as determined by the risk assessment.

- When testing or using heavy objects, a box containing soft material should be placed under the object to cushion the fall.

- Do not use mains powered hairdryers or fans near water.

- Be aware of the dangers of using or testing flying objects e.g. launching/dropping experiments, spinning disks, catapults.

- If launching helium balloons the local airport must be notified.

Reference: Be Safe, Third Edition, the Association for Science Education

APPENDICES

Appendix 1

Health and Safety Documents

In addition to this document and documents available on the internet, the following may be included in the school's Health and Safety reference library:

East Dunbartonshire Council, Community Directorate Health and Safety Policy, November 2002

Health and Safety Bulletin 04/02 Health and Safety Arrangements for the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR) Revised May 2004

Hazardous Chemicals - A Manual for Science Education, SSERC, 1997, ISBN 0 9531776 0 2.

Preparing COSHH Risk Assessments for Project Work, SSERC

SSERC Bulletins (current advice plus specifics - referred to out of Safeguards in the School Laboratory, ASE).

Biology/Biotechnology, Safety in Microbiology, A Code of Practice for Scottish Schools and Colleges, SSERC 2002

Materials of Living Origin, A Code of Practice for Scottish Schools, 2nd Edition SSERC 2005

Working with radioactive sources - What you should know and do, SSERC, 2001.

ASE, Safeguards in the School Laboratory, ASE, 1996 (10th Edition), ISBN 0 86357 250 2.

ASE, Topics in Safety, ASE, Third edition, 2001 ISBN 0 86357 316 9.

CLEAPSS, Hazcards, preferably the 2000 update of the 1995 edition (available from SSERC).

Risk Assessments

The following documents are still in use in East Dunbartonshire Council:

Master Safety File (MSF)	originally published by Strathclyde Regional Council
Subject Safety File/Technical (SSF/T)	originally published by Strathclyde Regional Council
General Safety File (GSF)	originally published by Strathclyde Regional Council
COSHH Safety File (COSHH)	originally published by Strathclyde Regional Council

Appendix 2

Banned Chemicals in East Dunbartonshire Council

The following chemicals must not be used in East Dunbartonshire Council schools. If a chemical is not listed below it does not imply that it is safe to use. Risk assessments must be in place for all procedures involving hazardous chemicals.

Asbestos containing materials
Alkyl sulphates
Phenylamines and their salts e.g. 4-aminodiphenyl
4-nitrodiphenyl
Benzene or anything containing more that 0.1% benzene
Crude oil
Petrol
Benzidine and its salts
Biphenyl substituted by
i) at least one nitro or primary amino group
ii) further substitution by halogeno, methyl or methoxyl groups but not by other groups in addition to substitution as in i) above.
Carbon disulphide
Chloroethene (vinyl chloride monomer)
1,2-dibromoethane
1,2-dichloroethane
Ethylene dibromide
Ethylene dichloride
Hydrazine
Iodomethane (methyliodide)
Isocyanates
Methanal (formaldehyde)
2-naphthylamine (2-naphthalene-2-amine) and its salts
Phenol
Picric acid
Naphthalen-1-amine or naphthalen-2-amine (alpha- or β-naphthylamine)
Naphthylbiphenylazo dyes in general
Nitrosamines
N-nitroso compounds should not be prepared. Avoid accidental preparation.
Nitrosophenols
Nitronaphthalenes
Trichloroethene (trichloroethylene)
Tetrachloromethane (carbon tetrachloride)

Appendix 3

Reference Agencies

Human Resources Department, Health and Safety Section

Tom Brown, Health and Safety Adviser
Tel: 0141 578 8114
Mob: 07768 032421
E-mail: tom.brown@eastdunbarton.gov.uk

Kathy Bow, Health and Safety Adviser
Tel: 0141 578 8089
Mob: 07768 658101
E-mail: kathy.bow@eastdunbarton.gov.uk

Education Quality & Development Service

Alasdair Deans, Quality Improvement Officer – Science
Tel: 0141 578 8745
E-mail: alasdair.deans@eastdunbarton.gov.uk

Technical Support Centre

Eileen Lister, Team Leader - Technician Service
Tel: 0141 578 8727
E-mail: eileen.lister@eastdunbarton.gov.uk

Gerry Speirs, Technician Service Advisor
Tel: 0141 578 8724
E-mail: gerry.speirs@eastdunbarton.gov.uk

Scottish Schools Equipment Research Centre (SSERC)

2 Pitreavie Court
South Pitreavie Business Park
Dunfermline
KY11 8UB

Tel: 01383 626070
Fax: 01383 842793
E-mail: sts@sserc.org.uk
http://www.sserc.org.uk

The Association for Science Education (ASE)

College Lane
Hatfield
Herts.
AL10 9AA

Tel: 01707 283000
Fax: 01707 266532
E-mal: membership@ase.org.uk
http://www.ase.org.uk

Health and safety publications

Health and Safety Executive (HSE) publications relevant to Science Departments

Health and Safety at Work etc Act 1974, HMSO	ISBN 0 10 543774 3
Management of Health and Safety at Work Regulations 1999	ISBN 0 7176 0412 8
Workplace (Health, Safety and Welfare) Regulations 1992	ISBN 0 7176 0413 6
Provision and Use of Work Equipment Regulations 1998	ISBN 07176 1626 6
Personal Protective Equipment at Work Regulations 1992	ISBN 0 7176 0415 2
Managing health and safety in schools	ISBN 0 7176 0770 4
5 Steps to Risk Assessment	ISBN 0 7176 0904 9
An introduction to local exhaust ventilation	ISBN 0 7176 1001 2
Maintenance, examination and testing of local exhaust ventilation	ISBN 0 7176 1485 9
Managing health and safety: 5 steps to success	INDG275
An introduction to health and safety	INDG259
COSHH; the brief guide for employers	INDG136
Electrical safety and you	INDG199
Working with VDU's	INDG36
Introducing the Noise at Work Regulations 1987	INDG 75
Working Alone in Safety	ISBN 07176 1507 6

sustainable thriving achieving
East Dunbartonshire Council
www.eastdunbarton.gov.uk

Risk Assessment _____

School: _____ **Department:** _____

Unit assessed	

Significant hazards and risk control measures	**General points:** **Activities:**

Additional information:

The people who are at risk from significant hazards in this unit of work are the pupils, the class teacher and science technicians. Classroom assistants and Support for Learning staff may also be at risk.

The risk assessment information above will be adapted appropriately to account for changes in circumstances.

Risk assessment details for this unit of work have been discussed and agreed at departmental level.

Notes on the recommended controls and agreed adaptations to procedures for significant hazards are transferred to the Teacher's Working Guide.

Class teachers are familiar with Immediate Remedial Measures, fire blanket and fire bucket.

Principal Teacher's Signature: _____ **Date:** _____

Dates reviewed:

East Dunbartonshire Council

Risk Assessment – worked example
Thomas Muir High School **Chemistry Department**

Unit assessed	Intermediate 2 Chemistry: Unit 2 Carbon Compounds (Part 1) (Chemcord)

Significant hazards and risk control measures:	**General Points:** • Safety goggles must be worn • Liquids used in this section are highly flammable; room must be well ventilated, use small volumes, keep away from naked flame or other sources of ignition. • Refer to Bunsen burner risk assessment. **Activities:** 2.1b Burning Fuel – This activity is not recommended but can be teacher demonstration. Use small amounts of liquid absorbed on mineral wool. Use petroleum spirit as substitute for petrol. Use ethanol. 2.2 Burning Natural gas – Use small blue Bunsen flame. Lime water is irritant. 2.3 Incomplete Combustion – Risk of minor burns from hot tongs. 2.4 Sparking of Air (Demonstration) – Use pre-assembled EHT apparatus ready to switch on. Small container (flask) to collect gas. Switch on 20 minutes before required. Do not open container unless in fume cupboard (nitrogen dioxide). Ensure EHT power supply is checked and safe. Do not allow pupils access to power supply. 2.5 Distillation –Use prepared ethanol/water mixture. Use micro burner or standard Bunsen burner with small flame. Anti-bumping granules. Keep ethanol away from sources of ignition. 2.7 Fractional Distillation in the Laboratory – Teacher demonstration. Use recipe for artificial crude oil (SSERC CD/CLEAPPS). Real crude oil must not be used as this contains benzene. Use only $3cm^3$ of mixture in large side-arm boiling tube fitted with a long delivery tube. (See Petroleum Spirit Fractions on SSERC CD). Tarry residues should not be handled. 2.18 Esters (various) – Highly flammable; keep away from naked flame. Some have harmful, irritating vapour. Check label on bottle. Use wafting technique to check smell. Use small quantities for tests (5 drops). Dispose of water/ester mixture in organic waste bottle.

Additional information:

SSERC SafetyNet CD – Petroleum spirit; Nitrogen dioxide; distillation of crude oil; Hazcards – 43 Ethyl ethanoate; 45 hydrocarbons; 84 Propanol.
Refer to Bunsen burner risk assessment

The people who are at risk from ***significant hazards*** in this unit of work are the pupils, the class teacher and science technicians. Classroom assistants and support for learning staff may also be at risk.

The risk assessment information above will be adapted appropriately to account for changes in circumstances.

Risk assessment details for this unit of work have been discussed and agreed at departmental level.

Notes on the recommended controls and agreed adaptations to procedures for significant hazards are transferred to the teacher's working guide.

Class teachers are familiar with immediate remedial measures, fire blanket and fire bucket.

Principal Teacher's Signature:_____ Date: _____

Dates reviewed:

Ionising Radiations

Jim Jamieson the Radiation Protection Adviser for East Dunbartonshire Council has prepared a set of papers on different aspects of health and safety guidance which have been placed on the SSERC website for downloading.

http://www.sserc.org.uk/members/SafetyNet/Radioactivity/Main_Menu.htm

These are tabulated below.

	Document name	**Comment**
1	Working with radioactivity: What you should know and do	Poster to be placed on display on Physics Department notice boards
2	Working with radioactive substances: Record and management list	Pro forma on which school records should be kept; it includes a management check list for use by the PT Physics
3	Risk assessment: Use in schools of sealed radioactive sources	Includes a set of working procedures to control risks
4	Contingency plans	Planning for unusual occurrences
5	Protocol on the ageing and leak testing of sealed radioactive sources	Includes details of leak testing sources
6	Leak test analysis	Excel file for analysing leak test results
7	Radioactive source storage	With best practice on storage
8	Radiological protection in schools: Training needs	Guidance for Councils and teachers on training needs

You should already have copies of earlier versions of some of these documents. Please note that all of the long-established documents have been revised and rewritten. Others (3, 4, 7, and 8) are new.

Guidance on Eye Protection

- Eye protection should be to the appropriate British Standard or the newer BS EN equivalent.

- Older stocks of goggles should be made to BS 2029:2 (or 1) C; they may also carry M and D (C – chemical, M – molten metals and D – dust).

- Newer goggles should bear BS EN 166 1F (or B) and possibly N or K on the lens with BS EN 166 1F (or B) and 3 on the frame. The 3 on the frame means that it is resistant to liquid droplet splashes (i.e. to chemicals) and is equivalent to C in the older BS.

Appendix 8

Recording and Reporting Procedures

To ensure compliance with legal requirements the following will be in place:

- Risk assessments will be held in a folder and be made available for all to read and be familiar with.

- Any identified new risks or hazards must be reported to the Principal Teacher or the Head Teacher in the primary school as soon as possible and a new risk assessment undertaken.

- The Principal Teacher as a competent person in the secondary school and the Head Teacher in the primary school may undertake the assessment, or as line manager will, from his/her staff nominate a suitably competent person who can undertake the assessment.

- A record of statutory inspections carried out in the science department

- A record of all relevant health and safety courses attended by department staff will be maintained.

- Within the department a strict procedure will be maintained which will allow for the health and safety of the pupils to be at a premium.

- All accidents and incidents to pupils in the department must be reported according to East Dunbartonshire Council's Accident/Incident Reporting Procedures.
  Ref: Health and Safety Arrangements for the Reporting of Injuries, Diseases and Dangerous Occurrences Regulation 1995 (RIDDOR) June 2004.

Industrial Visits

Industrial visits must be undertaken in accordance with current East Dunbartonshire Policy.

Chemical Spills Kits

Each science department in the secondary school must have a Chemical Spillage Kit containing the following:

- Anhydrous sodium carbonate, 2 packs of 2 kilos, each labelled
  'Sodium carbonate – Harmful, for treating 1 litre of a spillage of concentrated mineral acid'.

- Citric acid, 10 packs of 200g, each labelled
  'Citric acid, for treating approximately 1 litre of 2M sodium or potassium hydroxide or 200ml of 880 Ammonia'.

- Mineral absorbent (cat litter), 2 packs of 3 kg, each labelled '3 kg mineral absorbent which can absorb approximately 1 litre of liquid'.

- Sand (dry), 4 kg, labelled 'For mixing with water reactive fuming corrosives'.

- Lime/sulphur mix (200g of each), labelled 'for covering and treating residual unlifted beadlets of mercury' together with a paint brush for applying the mixture.

- Teepol L detergent, 2.5 litre, labelled 'Teepol L, emulsifies an equal volume of water immiscible liquid'.

- Personal protective equipment, 4 pairs nitrile gloves in a range of sizes, disposable non-latex gloves, goggles, PVC apron and face shield.

- Plastic bucket and mop.

- Plastic dustpan and brush.

- Column (plastic drinks bottle with base cut off and plug of glass wool or foam plastic) for washing used absorbent free of contaminant.

- Small plastic syringe for lifting mercury.

- Plastic bags, scissors and Sellotape.

- Hazard warning tape or labels and some blank labels.

The kit for a store could contain much the same items as that for the prep. room, but with the first four scaled up by a factor of 3. The packs of citric acid should be increased to 1 kg.

Further information
Further information on spillage and disposal can be found in the *SSERC Hazardous Chemicals Manual 1997, Section 5 and 6*

Microbiology Spills Kit

Each science department in the secondary school must have a Microbiology Spillage Kit for Level 3 work which must contain the following:

- A screw-capped bottle containing a measured quantity of undiluted disinfectant with the correct volume of water needed to dilute it marked on the side
- A quantity of paper towels
- A pair of autoclavable tongs or a small plastic dustpan
- A pair of disposable, non latex gloves
- An autoclavable waste disposal bag
- An autoclavable container, with suitable means of closure into which contaminated, broken glass may be easily transferred for sterilisation

The spillage kit should be placed in a prominent site for ease and speed of access during practical work.

Ref: Biology/Biotechnology: Safety in Microbiology, A Code of Practice for Schools and Colleges, SSERC 2002.

Appendix 11

Guidelines for All Science Staff

1. Teachers and technicians have a general duty to take reasonable care for the health and safety of themselves, of other members of staff and of pupils. They have a duty to be familiar with this safety policy, its updates, appendices and the safety texts being used as references. They must observe its requirements and fulfil any special responsibilities it gives them. They must co-operate with colleagues in meeting their own specific safety duties.

2. Staff must set a good example to pupils and be consistent with the Safety Rules for Pupils in the science department.

3. Staff must be familiar with emergency evacuation drills and familiar with the location in each laboratory or room of the following: personal protective equipment, the escape route, fire-fighting equipment, the nearest first-aid box, the eye wash stations, the main gas isolation valve, the mains electricity switch and the main water isolation valve.

4. The main gas isolation valve and the mains electricity switch should be in the 'OFF' position and isolated when not in use.

5. Laboratories and prep rooms must be left safe. Special arrangements must be made for any equipment that has to be left in operation overnight and hazardous equipment that has to be left out. In general, all mains-operated apparatus, and gas controls if any, must be switched off. At the end of each day, wherever practicable the departmental electricity supplies are to be switched off at the main isolating switch/switches.

6. Eating, drinking and smoking should not take place in laboratories or prep rooms.

7. A teacher or technician must think very carefully before conducting any practical operations when alone in the department. The procedures for working alone must be followed.

8. When not in use, laboratories are to be locked by the staff unless so doing hinders a fire escape route. They should be not be used for non-science club activities.

9. Technicians should ensure that they are familiar with any hazards and appropriate precautions which might be encountered in preparing equipment for lessons and in clearing equipment away.

Guidelines for Science Teachers

1. At the beginning of each school year, teachers must make sure that their teaching areas display safety rules. It would be appropriate for classes to be issued with copies of the pupil rules. These should be attached in the pupils' exercise book or binder.

2. Teachers must enforce the rules, reminding pupils of them often enough for them to remain familiar. With first year pupils, time should be spent explaining these rules, with appropriate demonstrations.

3. Pupils must not be left unsupervised in a laboratory at any time.

4. Teaching staff need to assure themselves that lesson preparation is adequate and includes checking risk assessments and other appropriate safety precautions. Time should be allocated to allow for consultation to occur with more senior colleagues where any doubts are apparent. Staff should also allocate time to try out unfamiliar procedures, particularly those involving specific hazards. Teachers should explain methods and precautions to pupils as part of their safety education.

5. Projects and open-ended investigations must be so organized in a way to allow the teacher to assess any risks and lay down precautions before any hazards are encountered.

6. If safety cannot be maintained during practical work, immediate procedures must either be modified or abandoned.

7. A teacher is responsible for the safety of any of their classes when taken by a student teacher. If the normal class teacher is absent, the Principal Teacher must take this responsibility.

Appendix 13

Safety Rules for Pupils

1. You must not enter a work area unless a teacher is present.

2. You must not do anything with equipment or materials unless told to do so by your teacher.

3. You must follow instructions precisely.

4. You must take reasonable care of the health and safety of yourself and of others who may be affected by your acts or omissions during work.

5. Remove your jacket, coat, school bags etc. and place them where they do not interfere with the safe working or movement of anyone.

6. Enter and leave the department in an orderly manner.

7. You must not run in the corridor or laboratory.

8. You must not eat, drink, taste, chew or put anything in your mouth while in the laboratory.

9. You must examine personal protective equipment e.g. eye protection, disposable gloves etc. before use and report any obvious damage to your teacher.

10. You must wear personal protective equipment e.g. eye protection, disposable gloves etc. when told to do so and keep it on until your teacher tells you it is safe to remove it.

11. You must ensure that you carefully store away all personal protective equipment at the end of the period.

12. You must work carefully and in an organised manner at all times.

13. Due to certain dangers, loose clothing must be secured, long hair tied back and where relevant loose jewellery removed.

14. You should examine glassware and equipment before use and report any obvious damage to your teacher.

15. You must wash off any chemicals that get on your hands or any other part of your body immediately.

16. You must wash your hands after working with chemicals, microbiological, animal or plant material.

17. You must tidy away glassware and equipment you have used at the end of the period.

18. You must tidy up bench tops before you leave at the end of the period.

19. You must dispose of waste and surplus material in accordance with the teacher's instructions.

20. You must report all breakages, accidents, spillages or incidents, no matter how minor, to your teacher immediately.