BIOLOGY DEPARTMENT

DEPARTMENTAL SAFETY MANUAL

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INJURY OR ILLNESS
(FIRST AID)

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1. In any accident involving injury of any type seek help from one of the **qualified First Aiders** in the Department. A list of those currently qualified is listed below.

2. First Aid kits are located in all laboratories to treat minor cuts, abrasions, burns etc. With the kit is an Eye-Wash bottle. Some laboratories should also have a bottle of phenol antidote (70% polyethylene glycol 300 and 30% IMS) to treat skin contacts with phenol.

3. More serious injuries must be treated at the Casualty Department of the Leicester Royal Infirmary after preliminary emergency care where appropriate.

4. There is an emergency shower in Lab 311 to wash off large scale reagent splashes on exposed skin and hair.

5. **ALL** accidents involving personal injury must be recorded on an Accident Form, a supply of which is kept in the Chief Technician's Office (room 339).

6. **First Aiders at 14/08/2002**

Name	**Room number**	**Telephone**
Dr John Bailey	321	**3386**
Mrs Lesley Barnett	301	**3313**
Dr Colin Ferris	323	**5152**
Dr Ted Gaten	309B	**3387**
Dr David Harper	304	**3346**

If an ambulance is required, key 888 (if no response 9-999) on any telephone. KEEP CALM. Ask clearly and concisely for the Ambulance Service. GIVE A SPECIFIC LOCATION, e.g. "Leicester University, Adrian Building, Main Foyer". Send a reliable person to act as a guide.

IN CASE OF FIRE

If the Fire Alarm Sounds

All personnel not involved in either fire fighting or room checking MUST LEAVE THE BUILDING IMMEDIATELY by the nearest safe exit.

Where practicable and safe to do so windows and doors should be closed, gas burners extinguished and apparatus turned off.

Upon leaving the building you should proceed by a safe route to the upper level of the main concourse on the left (Bennett building side) of the steps. This allows the Department to assemble as one group.

DO NOT - use lifts, find the nearest stairway;
- attempt to retrieve personal possessions or outdoor clothing;
- re-enter the building until you are told it is safe to do so by the fire brigade or the University Safety Officer.

REMEMBER IN ALL CIRCUMSTANCES AVOIDING PERSONAL INJURY IS THE MAIN CONSIDERATION

If You Discover a Fire

SOUND THE NEAREST FIRE ALARM

PHONE FOR THE FIRE BRIGADE by dialling 888 or, if no response, 9999 on any University phone or 999 on a pay phone.

NB Sounding the fire alarm does not automatically summon the emergency services.

Remain calm, give a precise location for the fire, e.g. University of Leicester, Adrian Building, 3rd floor, lab 319. If anyone is near send them to act as a guide for the emergency services.

ONLY IF SAFE TO DO SO attack the fire with the appropriate equipment. Remember a single extinguisher will only cope with a fire that is about the size of an office waste paper bin.

CALL THE FIRE BRIGADE FIRST
The fire brigade would rather be called out to a small fire and find it has been extinguished. Therefore if you tackle a fire before calling the fire brigade and cannot control it, valuable time has been lost and a large fire has to be dealt with.

DO NOT ATTEMPT TO FIGHT A FIRE

· if there is any danger of escape routes being obstructed by smoke or fire;
· if there are gas cylinders or chemical stocks threatened by fire;
· if the fire involves burning gases;
· with the wrong sort of extinguisher;
· if after one extinguisher the fire still grows.

SAFETY FORMS

The following forms are available via the CWIS:

COSHH form

Common User Declaration

Faculty Risk Assessment for modules

Induction form

These are also available on CFS and may be obtained as follows:

After logging on, double click: **My Computer**, **Departments on 'cfs.le.ac.uk\Root'**, **Biology**, **Information**, **Safety**.

1. PREFACE

This document in conjunction other Laboratory Safety material produced by this department are in accordance with the requirements of the 'Statement on Safety in Laboratories' issued by the University in 1995 and with the Health and Safety at Work Act, 1974.

Under these provisions it is Departmental policy to provide, so far as is reasonably practicable, an environment to staff, students and visitors that is safe and without risk to health.

There are special regulations applying to Safety in the following areas:

For **Radiation Protection** see:-

Dr P Jarvis, Departmental Radiation Protection Officer Lab 337/8

Radiation Protection Supervisors:-

Dr R R Harris Lab 304/6
Dr E Rosato Lab 226
Prof D Twell Lab 337/8
Mr Tony Wardle Lab 337/8
Mrs Lesley Barnett - Room 301

For **Adrian Building** see:-

Mrs Lesley Barnett Building representative and Clinical Waste
Miss Ila Patel Clinical Waste Genetics Dept

For **Genetic Modification** see:-

Diane Warne, Biological & Chemical Safety Officer (Safety Services) ext. 2020

Dr Simon Møller is happy to give informal advice.

2 INTRODUCTION

Laboratory safety depends on the careful planning of laboratory activities, on the availability of information and advice about hazards and on the readiness of all concerned to keep to sensible rules and to encourage others to do likewise. Carelessness and lack of foresight are very human characteristics, and keeping this constantly in mind can help prevent many of the commonly occurring laboratory accidents. The following simple rules may help:

2:1 **Remove the Hazard**

Laboratory operations should be subject to continuing review. Is it really necessary for us to have dangerous substance X? Must we continue to carry sharp/fragile/hot/ corrosive things around?

2:2 **Reduce the Hazard**

Do we need to work with such a large amount? Would plastic be safer than glass?
Could the process be carried out in a safer place?

2:3 **Guard Against the Hazard**

If the substance explodes will it injure people, cause trivial or severe damage? Have we secured everything that is likely to collapse, fall over or strike other things?

2:4 **Warn About the Hazard**

Are we relying on common sense when we should be positively informing people? Should we be doing more to replace 'everybody knows' with 'everybody has been told in writing'? Are our signs and notices clear and concise and do they conform to the relevant regulations?

2:5 **Protect Against the Hazard**

Only after we have been through and completed 2:1 to 2:4 may we rely on protecting the person. Gloves, glasses, coats, visors, aprons etc have their place, but they must not be used as a substitute for a safe system of work.

2:6 **YOU MUST CARRY OUT RISK ASSESSMENTS**

To identify hazards, RISK ASSESSMENT is necessary. It is an Offence to handle substances hazardous to health without carrying out a Risk Assessment. All laboratory and fieldwork procedures should be subjected to risk assessment (not just those involving substances covered by COSHH regulations). Risk Assessment enables you to IDENTIFY THE HAZARDS. Steps can then be taken to ensure that the hazards are removed or safely controlled.

2:7 **USE WRITTEN PROTOCOLS**

You should use written protocols for all complex or hazardous procedures. (You will only know if procedures are hazardous after carrying out a Risk Assessment). If you follow a written protocol you are unlikely to make errors that could lead to accidents. Written protocols are ESSENTIAL for the training of others.

2:8 **Filing Risk Assessments and Protocols**

You should keep copies of Risk assessments and Protocols in a labeled folder in the laboratory where it can be accessed by all workers. Copies should also be saved in the Department's Safety File in the Department Folder on the CFS using the following pathway. After logging on double click: **My Computer**, **Departments on 'cfs.le.ac.uk\Root'**, **Biology**, **Information**, **Safety, C.O.S.H.H., completed forms**. By keeping copies centrally, we can all help each other by disseminating information on (1) Hazards (via Risk assessments) and (2) How to carry out different operations (via Protocols).

2:9 NOTE: We are **legally** required to provide a **SAFE WORKING ENVIRONMENT**

All employees **ARE LEGALLY REQUIRED TO COOPERATE IN BRINGING THIS ABOUT**. The Health and Safety Executive has enormous powers. They carry out inspections to make sure that Universities comply with the law and that workers are not working in unsafe conditions. It is particularly important that appropriate Health and Safety arrangements are in place because
1) they provide you with a safe environment
2) your lab would be closed down and you could be prosecuted for non-observance of the law. (A number of universities have been prosecuted in the immediate past and this University has been recently served with an enforcement for non-compliance with regulations). You should realise that in the event of a serious accident an HSE inspection would follow automatically and that they could use their powers to inspect anything.

IF YOU ARE IN DOUBT OR UNSURE REGARDING ANY ASPECT OF WORKING WITHIN THE DEPARTMENT, THEN ASK FOR HELP OR ADVICE.

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3 LINES OF RESPONSIBILITY & AUTHORITY FOR HEALTH & SAFETY

3:1 **Head of Department (Professor G Whitelam)**

According to item 1:4 of the University Statement of Safety Policy, overall responsibility for the implementation of safety policy rests with the Head of Department (HoD). This responsibility, which cannot be delegated, is discharged through a Departmental Safety Officer and Laboratory Safety Supervisors appointed by the HoD and through a Departmental Safety Committee upon which these officers and elected representatives of research personnel etc serve.

3:2 **Departmental Safety Officer (Dr P M J Shelton)**

The Departmental Safety Officer (DSO) has the FULL authority of the HoD to implement safety policy, including where necessary to prevent or stop procedures which contravene safety regulations or which appear to be hazardous.

3:3 **Departmental Fieldwork Safety Adviser (Dr C Ferris)**

All postgraduate and project students undertaking fieldwork must register with the Departmental Fieldwork Safety Adviser (DFSA). Before undertaking fieldwork a Risk Assessment Form must be completed and signed both by the student's supervisor and the DFSA. Copies of all completed risk

assessment forms must be kept in the laboratory safety folder and also lodged with the DFSA.

3.4 **Departmental Radiation Protection Officer (Dr P Jarvis)**

All people planning to use radiation should report to Dr Jarvis.

3.5 For **Departmental Clinical Waste** see:-

Mr Tony Wardle
Deputy

3.6 **Laboratory Safety Supervisors**

Name	**Laboratory or Area of Responsibility**
Dr J Bailey	321
Mrs L Barnett	204, 205, 246, 345A, LG5, LG10, LG15
Dr F Clark	219, 221,Insect Room A & B
Dr W Cockburn	328, 342, 344, 345B, 401, 407, Growth Rooms
Dr C Ferris	322, 323
Dr E Gaten	309B
Dr A Gilburn	220, 219, 257
Dr R Gornall	322, 324, Herbarium, Botanic Garden
Dr D M Harper	304
Dr R R Harris	305, LG18 (1, 2,& 3)
Dr P J B Hart	234, 234A, LG52
Prof Heslop-Harrison	316, 317, 318, 319, 350, 351, 352
Mr S Ison	262,301
Dr P Jarvis	337,337A,338,337B,337D,337E
Dr S Moller	334
Mr M Pratt	LG4,309,339,341,Hastings House Cabinet,309
Dr E Rosato	226, 228, 229, 256, 258, LG60 & LG62
Dr T Schwarzacher	315
Dr M Sheehy	309A
Dr P M J Shelton	307, LG23F, LG61
Dr D Twell	311A,311,312,312A,312B,313,349
Dr M H Walker	242,306,308,310
Prof G Whitelam	LG22A/B,LG23A/B/C/D,LG22B(1, 2, 3), LG24, LG60A,LG63,LG64, 314,329,329A,331,332,333,357

The role of the Laboratory Safety Supervisor (LSS) is to act under the direction of the DSO, to oversee matters of safety in the laboratories in which they work or of which they have appropriate specialist knowledge.

LSS's are also required to make sure that Risk Assessments are completed and that there are written protocols.

3:7 **Departmental Safety Committee**

The Committee will consist of the Head of Department (ex-officio member), Departmental Safety Officer, Laboratory Safety Supervisors, representatives of both the technical and the research staff and the Departmental Field Safety Supervisor. Dr P M J Shelton, Departmental Safety Officer, will Chair the meetings. The Committee will meet at least once a year.

3:8 **University Specialist Safety Advisers**

Dr D Widdowson Int. Phone 2425/26 - Director of Safety Services
COSHH, chemical hazards, hazardous biological agents, genetic modifications

Ms D Warne Int. Phone 2020 - Chemical & Biological Safety Office

Mr T Edwards Int. Phone 2651 - Fire Safety Officer
Fire safety, buildings, 'contractors' workshops.

Mr J Scott Int. Phone 2652 - Radiation Safety Officer
Radiation Safety, asbestos, electrical safety.

Dr A Ellis (Chemistry) Int. phone 2138 - Laser Safety Officer

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4 . PROVISION OF HEALTH AND SAFETY INFORMATION, INSTRUCTION AND TRAINING

4:1 **Information**

The Head of Department has overall responsibility for the provision of safety information, but in practice this will be available through the DSO, see also the noticeboard in the corridor outside Room 302.

4:2 **Instruction**

All new workers will undertake safety induction training before commencing work in the Department. This will be carried out by the Laboratory Safety Supervisor or their appointee. The LSS must be informed when a new worker, guest worker, postgraduate or project student is about to start work in their area. The Induction form must also be completed.

4:3 **Training**

Specific training will be given by your LSS or by a member of staff designated by them who is experienced in a particular technique together with its attendant safety aspects.

LSS's may delegate training but must follow up to ensure adequate training has been received.

If you do not feel you are receiving adequate training, discuss this matter first with your LSS and then with the DSO.

The University encourages staff to attend First Aid courses approved by them. There are also regular courses on safety.

5. GENERAL LABORATORY PRACTICE

5:1 Access to Laboratories

5:1:1 The Department requires the wearing of identity badges throughout the University. It will be found that wearing your badge becomes an essential part of gaining access to certain areas of the University.

5:1:2 Animals must not be brought into the Department.

5:1:3 The Department does not normally allow access to the Department by children and friends. Children are prohibited from entering laboratories and members of staff **are required to seek specific permission from the Head of Department before bringing a child to work.** Children may only be brought into the Department under supervision by a parent or guardian. All visitors must be signed in to the building. The University's policy on access of children to the University is available at:
http://www.le.ac.uk/safety/documents/children-policy-1203.pdf

5:1:4 Normal working hours are between 8.00am and 6.00pm, Monday to Friday excluding public holidays and University closures. Outside these times is considered to be 'out of hours working'.

5:1:5 Out of hours working is allowed provided:

that the late book located in the Adrian Building Main Entrance is completed.

that out of hours working involving work of a potentially hazardous nature has been discussed and authorised (FULL RISK ASSESSMENT- sheet in front of the manual) by your LSS and/or your supervisor and this work should be conducted within the hailing distance of another person.

discussion of out of hours working with both your supervisor and your LSS is encouraged.

the security of the building and your safety requires that during out of hours working the building is kept locked. THIS IS YOUR RESPONSIBILITY. Do not let people into the building unless they can identify themselves as members of staff.

5:1:6 Before commencing work, all new staff MUST have a safety induction at which Departmental safety policy is explained, be issued with a safety book and manuals, be given training in Departmental safety procedures.

5:2 Adrian Building Keys

5:2:1 Swipe cards to gain access to the Adrian Building outside of normal working hours and internal keys to the Adrian Building are only issued on the production of a letter of authorisation obtainable from the Departmental Office

or Head of Department's Secretary and countersigned by the Laboratory Safety Supervisor of the laboratory in which you are working. There is a £5 returnable deposit to be paid for the card and each key.

5:2:2 In the first instance, you should take your letter of authorisation to the School Office (Room G21) where you will be issued with the internal keys that you require. The School Office will issue you with a further authorisation slip which will allow you to be issued with a swipe card. These are available from Mr N Osman, Estates and Buildings, Fielding Johnson Building between 3.15 and 4.00 pm each day.

5:2:3 **Under no circumstances lend your Adrian Building swipe card or keys to anyone else.**

5:3 Reporting of Accidents and Dangerous Incidents

5:3:1 All accidents and dangerous incidents however trivial MUST in the first instance be reported to the Chief Technician or the DSO. All injuries to persons MUST be recorded using an Accident Form (available in the Chief Technician's Office (301) and must be accessible at all times).

5:3:2 University policy requires that all (non-trivial) accidents and dangerous occurrences be reported by telephone and form to the University Safety Officer (in accordance with the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, 1995). These forms are available from the Chief Technician and will be filled in by him or his deputy.

5:3:3 In the event of an accident resulting in serious injury or fatality, during normal university hours the Registrar **MUST** be contacted immediately on 0116 2522419. The Registrar's Office have set procedures covering such events. Out of hours the Control Room at the Security Lodge (internal no. 2023) is manned 24 hours a day Saturday and Sunday and on weekdays between 17.30hr and 08.00hr. This desk carries a list of contact telephone numbers including the Registrar's home number.

5:4 Registration of Visitors, Visiting Workers and Contractors

5:4:1 Visitors should register at the front desk of the Adrian Building before entering the Department. Their host must take full responsibility for their safety and conduct throughout the visit ensuring all safety rules are obeyed when required.

5:4:2 Visiting workers MUST be registered with the Head of Department's Secretary before commencing work. Safety booklet and relevant manuals will be issued and a safety training induction given.

5:4:3 Contractors and service engineers visiting the Department to carry out repairs, maintenance, installations or building work MUST report to the Chief Technician or his deputy before commencing work. He should ensure that a permit to work, form UL/C1 or C2 has been completed either locally or through the University Estates and Services Office and that a Contractors General Code of Practice has also been issued.

5:5 Unattended Running of Apparatus, Equipment and Experiments

5:5:1 Experimental apparatus using electricity, gas, water, compressed air or vacuum may only be left on outside normal hours, even for short periods of less than overnight duration, if it has an official 'please leave on' notice

attached to it. These notices are available from the Chief Technician and have on their reverse side instructions regarding their use. Please note that technicians and Security patrols have instructions to turn off apparatus left running outside normal working hours without a notice or with an expired notice. Give a telephone number or details of safe shutdown in case a problem develops.

5:5:2 Electrical apparatus which appears to be over-heating or not functioning properly should be turned off. In the case of a potentially harmful fault in the services (eg over heating fuse-box, water leak etc) during working hours contact the Maintenance Department Fault Reporting line on 2319. Outside working hours ring 2023 or a person named at front of booklet. Discussion with your LSS or DSO regarding unattended running of apparatus, equipment or experiments is encouraged.

5:6 Protective Clothing

5:6:1 Laboratory coats MUST be worn by all members of staff whilst they are working in the laboratory. These MUST be cleaned regularly. As well as being unsightly and un-professional, wearing a dirty lab coat is un-hygienic and could become a potential hazard to your health and safety.

5:6:2 Safety spectacles are freely available from the Chief Technician and MUST be used when eye protection is required.

5:6:3 Safety goggles and face visors are available for use and MUST be used when eye or face protection is required.

5:6:4 Safety goggles and visors SPECIFICALLY for protection against ULTRA-VIOLET radiation are available and MUST be used when using any equipment that emits stray UV radiation.

5:6:5 The wearing of shoes with high heels is not encouraged. Shoes should offer adequate protection to the feet.

5:6:6 Insulated gloves are available both for hot and cold handling procedures. Gloves with elasticated cuffs will prevent spillage of liquids into the gloves and should be used. Disposable gloves used as hand protection against accidental spills MUST NOT be worn outside laboratories. This is to prevent the possible contamination of door handles, lift buttons etc, with toxic chemicals, radioisotopes and other biohazards.

5:6:7 If gloves are required to transport items between laboratories a clean container should be used making the wearing of gloves unnecessary. In certain circumstances, one glove may be worn whilst the ungloved hand is used to open doors etc.

5:6:8 Exposure to latex can cause a number of health problems including skin irritation and allergic reactions. These are caused by reactions to extractable proteins and/or chemical additives in the latex. Powder used to facilitate donning and removal of latex gloves poses an additional risk because allergenic substances can leach into the powder. This can become airborne and may lead to respiratory sensitization. The use of powdered latex gloves is prohibited and where possible, non-latex alternatives should be used. Those with known allergies, asthma or sensitive skin conditions should consider avoiding latex altogether. Guidance on the use of latex gloves is covered by the free HSE Leaflet "Latex and You" ISBN 07176 1777 7, available from University Safety Services Office.

5:6:9 Lab coats MUST NOT be worn in the Departmental Offices 329A.

5:6:10 Lab coats for visitors are available from the Chief Technician.

5:7 Storage and Consumption of Food and Drink

5:7:1 The consumption of food and drink in laboratories is PROHIBITED.

5:7:2 The storage of food and drink in laboratories is PROHIBITED.

5:7:3 Food may be stored in the fridge in the kitchenette Room 341b. The Reading Room 328 may be used for eating and drinking. The School Common Room is Room 128. Lab coats MUST NOT be worn in these rooms.

5:8 Smoking

5:8:1 NO SMOKING IS ALLOWED in any area of the Adrian building. A breach in the regulations may cause the fire alarm system to operate.

5:9 Falls, Floors and Corridors

5:9:1 Reduce the risks of falls by wearing sensible non-slip footwear and keeping laboratory and corridor floors clean, dry and free from obstruction. Clear any spills immediately and do not obstruct corridors by abandoning trolleys etc. in them.

5:9:2 Do not run through laboratories and along corridors. You could easily collide with someone coming the other way carrying something nasty. Take particular care when passing through doorways.

5:9:3 To be effective, fire doors have to be closed so do not wedge fire doors open. However, the majority of fire doors have been fitted with magnetic door retainers. Doors remain open until 2200 hrs each night unless the fire alarm is sounded when they will automatically close. They can be released manually be pressing the black button on the underside of the box.

5:9:4 Any faulty flooring or lighting should be reported immediately it is found to the Chief Technician to enable repairs to be carried out as soon as possible.

5:10 Solid Carbon Dioxide (Cardice) And Liquid Nitrogen

5:10:1 Solid Carbon dioxide is intensely cold (-78oC.) and will cause severe burns if it comes in contact with the skin. It is also constantly evolving Carbon dioxide gas so there is a danger of asphyxiation if it is used in unventilated areas. For this reason do not store or use it in the cold room or one of the other controlled temperature rooms as these are virtually airtight boxes with very little ventilation.

5:10:2 Always wear insulated gloves when handling it and always use it in a well ventilated area. Never pack it in gastight containers.

5:10:3 The same hazards are present with liquid nitrogen but to a greater degree as it is far colder and the rate of gas evolution is far higher so great care is required when handling this material.

5:10:4 There is a regular supply of liquid nitrogen to the department. It must be collected in the special stainless steel Dewar kept for the purpose. Do not use an ordinary thermos flask. Safety glasses and insulated gloves must be worn when collecting and handling this material. (See Malcolm Pratt or Tony Wardle for general advice and Dr P Shelton regarding handling advice.)

5:10:5 Do not travel in a lift or any vehicle with liquid nitrogen because in the case of a breakdown, spillage or container failure, the risk of suffocation is very serious.

5:10:6 Always use liquid nitrogen in a well ventilated area.

5:11 Lifting And Moving Equipment

5:11:1 The University's published Guidance Notes "Lifting and Handling" which can be found in the Chief Technician's office, offers valuable advice and should be consulted. Some guidelines are listed below.

5:11:2 **Lifting**

5:11:3 In lifting or moving equipment, plan a method which will involve the least amount of effort. Make an assessment of the task. A written assessment will have to be made if the lifting or moving is going to occur on a regular basis. Will you need help? Will you need special equipment? e.g. trolleys, skates, pallet truck etc. Check out the route. Is the final destination clear of obstruction?

5:11:4 Be aware of your own limitations, never attempt to lift or move anything you cannot safely manage.

5:11:5 Be aware of the nature of the article to be lifted e.g. unwieldy items like ladders
or half empty liquid containers, the liquid slops about thus altering the weight distribution. Give yourself plenty of room.

5:11:6 Protect areas of your body likely to be damaged e.g. wear gloves against possible
splinters. Keep sleeves rolled down, ensure that corrosive materials are securely
lidded or stoppered.

5:11:7 Never lift with a bent back. When lifting from a low position, always bend the
knees, keep the back as straight as practicable, thus using the powerful leg muscles to lift from a crouching position.

5:11:8 If you cannot manage on your own, get help.

5:12 Carrying

5:12:1 Only carry items that you can safely manage.

5:12:2 Large and/or heavy items must be carried using the appropriate equipment e.g. use a trolley or a sack barrow, gas cylinders in the cylinder trolley.

5:12:3 Winchester bottles must be carried in a Winchester carrier. Glassware should be transported on a trolley.

5:12:4 Packing cases and boxes are often secured using metal strapping. This has very sharp edges. Never lift using the strapping as this could cause cuts and if it breaks could cause the case or box to fall injuring the feet or toes. Be aware of protruding nails and splinters of wood. Use gloves.

5.13 Expectant Mothers: University Safety Guidelines

5:13:1 Key points for expectant mothers and for those planning pregnancy are:

i. As soon as possible confidentially inform the head of department, via the Chief Technician if appropriate, **with an accompanying written notification from your GP or midwife.**

ii. Carry out a risk assessment relating to your departmental duties. This assessment may change during the course of the pregnancy and again if the baby is breast fed. The Risk Assessment must be checked by the LSS.

iii. Exposure to the following physical factors demands extra caution when pregnant:

a. Vibration and bumps (shocks) ie when riding in a vehicle.

b. Lifting and handling loads.

c. Ionising radiation i.e. in isotope work.

d. Extremes of cold and heat.

iv. Take extra care or avoid exposure to **chemicals** that may act as **toxins** especially **cytotoxins**, **teratogens** or **abortificants**, particularly if they can be absorbed through the skin. These can include common pesticides. Check the hazard sheets relating to any chemicals you use. If need be ask your **LSS** or **DSO**.

5:13:2 Biological hazards to pregnancy should not be met with while working in the Biology Department. Treat microbial cultures and contaminants as described in section **24**. The *E. coli* strains used in plant molecular genetics are disabled and unlikely to grow away from culture media.

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6 . LABORATORY PRACTICE WITH HAZARDOUS MATERIALS

6:1 Unaccompanied Working

6:1:2 Lone working should always be avoided if possible. Members of the department MUST NOT be allowed to work unaccompanied with hazardous materials until their supervisor/LSS has assessed their ability to do so. This assessment may need to be made on more than one occasion to cover different techniques etc.

6:1:3 When working with radioisotopes, separate University rules apply and an independent assessment will be made by the Departmental Radiation Protection Officer (DRPO) or by your Radiation Protection Supervisor (RPS).

6:1:4 Undergraduate students engaged in final year projects etc MUST NOT be allowed to work unaccompanied until their supervisor/LSS has assessed their ability to do so and has provided adequate training to allow them to work competently and safely.

6:1:5 Undergraduate students may only work in the department 'out of hours' with the written permission of their supervisor and after discussion with the LSS and DSO. This permission MUST include a brief outline of the work to be done, and a Risk Assessment on the standard form. The DSO must approve access by signing the Swipe Card application form. Such out of hours working is not allowed if the work can be carried out during the normal working day.

6:1:6 All rules regarding control of access MUST be obeyed.

6:1:7 Undergraduate supervisors and LSS's MUST give great thought before giving written permission for 'out of hours ' working. No hazardous procedures are allowed out of hours.

6:2 Acquisition, Storage, Transport & Disposal of Hazardous Material

6:2:1 Acquisition of Hazardous Materials

a) Acquisition of all hazardous materials including all chemicals, solvents, acids and radio isotopes MUST be made through the Chief Technician using an official University order signed by him.

b) Copies of all requisitions for hazardous and non-hazardous materials are kept in the Chief Technician's office.

c) Before these orders are placed, both the user and his LSS MUST be aware of how to handle, store and dispose of these hazardous materials and that they are familiar with the proper methods of dealing with a spillage. User/supervisor signature on the chemical requisition and storage card is to say that knowledge has been obtained.

d) Hazardous materials now require formal RISK ASSESSMENTS to be carried out before work with those materials is carried out (see Biology Dept. LSM COSHH).

e) When hazardous materials are carcinogens, mutagens or teratogens and there is known risk to humans, orders WILL NOT be placed until safe handling, storage and disposal methods are in place. The DSO MUST be informed prior to ordering.

f) Human carcinogens (see 'Chemical Carcinogens' ISBN 0 85958 580 8) MUST NOT be allowed into the University until you have WRITTEN approval from the Head of Department. The HoD MUST CONFIRM that procedures for use, storage and disposal are adequate before giving his approval. The University Chemicals Hazards Officer MUST also be notified.

g) All chemical orders must be unpacked by the Chief Technician or his deputy and coded before being issued to the user. Each bottle must be coded with the order number and the date of arrival.

6:2:2 Storage of Hazardous Materials

a) The Chief Technician must be informed of all chemicals entering the department.

b) The separate storage of flammable, explosive, corrosive and oxidising materials in suitable containers should follow normal, good laboratory practice.

c) Compounds which are VERY TOXIC, TOXIC, CARCINOGENIC, MUTAGENIC or TERATOGENIC MUST be stored responsibly.

d) All stocks of flammable solvents MUST be stored in a solvent cabinet or in the solvent store outside the building.

e) Only minimum working stocks of flammable solvents may be kept out of store. NO MORE than 500cm3 is permitted as a working stock.

f) Working stock of solvents or chemicals MUST be adequately labelled. Waterproof plastic laminated labels are available. It is encouraged to provide as MUCH information on these labels as is provided on the original containers.

g) Acids and solvents MUST NOT be stored together. Acids and alkalis MAY BE stored together.

h) Flammable materials MUST NOT be stored in fridges, freezers or cold rooms unless that apparatus is labelled SPARK PROOF.

i) Samples etc stored in fridges, freezers and cold rooms MUST BE:

- suitably sealed
- adequately labelled with contents, your name and date
- liquids may expand on freezing. It is a wise precaution to place vessels inside a second labelled, unbreakable container that would contain spills or leaks.
- not stored on open shelves

6:2:3 Transport of Chemicals and Compressed Gases by Departmental Vehicles or Private Vehicles

If you wish to transport compressed gases or any other type of chemical from the University to another destination, you must first seek guidance and prior approval from your Laboratory Safety Supervisor. It is a requirement that the transport of such substances is in accordance with current UK law.

For each substance it is essential that you obtain:

a) Detailed information concerning the hazards associated with the quantities and concentrations carried.

b) How it must be packed and labelled.

c) How it should be segregated from other substances carried.

When transporting such substances by motor vehicle, full details must be entered in a file to be carried in the driver's compartment. This should include:

a) A list of chemicals carried.

b) Corresponding hazard data sheets and risk assessment forms.

c) The location of the substances in the vehicle.

In some cases it may be necessary to display a sign in the vehicle indicating the nature of the hazardous substance carried. However, you should seek guidance on this point from the Safety Office.

Because the risks associated with each substance are different, it is essential that you establish the procedures necessary for each one separately and inform the Laboratory Safety supervisor of the precautions you are taking.

You should establish that you are properly insured for the transport of the substances involved.

In the case of field courses you should consult with the Fieldwork Safety Supervisor if you are transporting compressed gasses or other chemicals.

If you leave chemicals in another laboratory/institution, you (as the supplier) must leave hazard data sheets and risk assessment forms with them.

For the transport of radio-isotopes, you must consult the Departmental Radiation Protection Officer (Dr P Jarvis) and obtain approval prior to your journey.

In all cases you should establish what you need to do, well before you need to travel.

When sending substances to other institutions or countries a separate covering letter should precede the package specifying material, quantity and hazards.

6:2:4 Spillage Procedures for Hazardous Materials

In any incident the safeguarding of life and health is paramount and should not be compromised in order to protect equipment or buildings.

Before purchasing hazardous substances you are required to obtain information regarding risks associated with that substance. Spillage procedure is part of that information as well as being good laboratory practice.

It is your responsibility to ensure that relevant chemicals or equipment for spillage are available. A spillage kit is kept in room 345A, the WASH UP Room opposite 306. This contains common items required to deal with spillages.

If you feel any spillage is too large or dangerous for you to control, obtain help, call the Fire Brigade by dialling 9999 or 888 on any University phone or by dialling 999 on a pay phone (no money is required).
All spillages and uses of the spillage kit MUST be reported to the Chief Technician or the DSO so that used materials can be replaced.

6:2:5 Disposal of Hazardous Substances (See also 'Departmental Waste Disposal')

All chemicals, solvents and hazardous materials in whatever medium MUST be disposed of safely and responsibly.

Only approved routes for disposal may be used (see Laboratory Safety Manual).

Before purchasing hazardous chemicals, you are required to obtain information regarding risks associated with that chemical. Disposal knowledge is part of that information required.

Many published disposal methods may be chemically difficult and time consuming. In this case, it may be useful to discuss with the LSS/DSO so that information gathered can be tailored to fit procedures used in this department.

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7. COSHH

7:1 COSHH is an acronym for the CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH. It is law and for the most part came into force on 1 October 1989, with a new version in 1994

7:2 Its purpose is to set down a sensible step by step approach to control of hazardous substances and to protect employees from exposure to them.

7:3 Failure to comply as well as exposing yourself and your colleagues to possible risk is an offence under the Health and Safety at Work Act 1974 and the COSHH regulations.

7:4 Substances covered by COSHH and CHIP (Chemical Hazard Information and Packaging) regulations are those which are to be found in the 'List of substances dangerous for supply' (HMSO ISBN 883901 2) where the nature of the risk is specified as:

7:4:1 VERY TOXIC, TOXIC, HARMFUL, IRRITANT or CORROSIVE.

7:4:2 Substances with chronic or delayed effects, ie CARCINOGENS, MUTAGENS or TERATOGENS.

7:4:3 Substances with MAXIMUM EXPOSURE LIMITS (MEL).

7:4:4 Certain MICRO-ORGANISMS. (New definition in COSHH 1994)

7:4:5 Substantial CONCENTRATIONS OF ANY KIND OF DUST in air.

7:4:6 Substances not mentioned above which create a hazard and are related to substances above.

7:5 The employer is required to:

7:5:1 Assess the risks to health arising from use.

7:5:2 Introduce appropriate control measures to prevent or control exposure to identified risk.

7:5:3 Ensure control methods are used, maintained and reviewed.

7:6 Employees are required to:

7:6:1 Use control measures.

7:6:2 Report defects in control measures.

7:6:3 Use protective clothing and equipment provided.

7:7 How will COSHH be implemented in the Biology Department?

7:7:1 The whole system revolves around the Risk Assessment forms which are available from the Chief Technician.

7:7:2 These MUST be completed before a substance covered by COSHH is USED. (NB for certain substances, eg HUMAN CARCINOGENS, purchase, use and storage will not be permitted until the Head of Department has given written approval after confirming procedures are satisfactory and that the Safety Service Office has been notified.)

7:7:3 You are not just assessing a substance *per se*, but that substance in a specific experiment or procedure. For example, if you use methanol (Toxic) in 20 different experiments or procedures it will be necessary to complete an assessment for each of the 20 experiments or procedures.

7:7:4 Once an assessment has been done for a substance in a particular procedure it can be used by other lab members as long as they have read and abide by that assessment.

7:7:5 Who completes the COSHH assessment form?

i) The Head of Department is ultimately responsible for Health and Safety matters. He may delegate the tasks of risk assessment but may not delegate the responsibility.

ii) The assessment forms are required to be completed by a COMPETENT person, but in the University environment no one person could be competent or physically able to complete all these forms.

iii) Therefore, in the first instance the user will begin the assessment. They will be expected to search out relevant information to enable the form to be completed. (Information list, see below).

iv) Once completed the form is handed to their Laboratory Safety Supervisor (LSS) who has more experience to make competent judgements regarding procedures and control measures.

v) When the LSS is satisfied that you have produced an adequate risk assessment, he will sign it.

vi) The LSS will then pass the forms to the Chief Technician.

· one copy is kept for Departmental records.
· one copy is returned to the laboratory where it is stored to enable free and easy access to all lab members.
· one must under certain circumstances (eg for carcinogens, mutagens and teratogens), be sent to the University Safety Officer.

vii) Assessments are required to be regularly reviewed, either when new information regarding a substance is discovered and on a regular basis.

viii) The easiest way to discover how to complete a COSHH assessment is to read the booklet issued by Leicester University titled 'COSHH ASSESSMENTS'. These are available in all labs or from the University Safety Office.

Assistance will always be given by your LSS and the DSO is always available to discuss problems or worries.

These regulations are for your protection, they should make you think more about substances you are about to use. They should also make you think about safe disposal and emergency procedures in advance.

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8 . SOURCES OF INFORMATION ON LIKELY CHEMICAL HAZARDS

8:1 Information labels.

8:2 Information from the manufacturer/supplier:

· Supplier's catalogues.

· Data sheets (can be requested with each order).

8:3 Information from general texts on chemical safety:

· 'Hazards in the chemical laboratory' 5th edition. L Bretherick. Royal Society of Chemistry.

· 'Hazardous Chemicals, 3rd Edition' University of Leicester.

· 'COSHH Assessments' University of Leicester

8:4 Sigma-Aldrich Material Safety Data Sheets. Database of hazard sheets available for general use in the Chemistry Department.

8:5 Current awareness periodicals:

· Laboratory Hazards Bulletin.

· Occupational Safety and Health.

8:6 Guidance material from the HSE:

· Toxicity Reviews TR series

· Guidance notes EH series

· Occupational Exposure Limits EH series

8:7 Information from professional bodies of Trades Unions.

8:8 Dr D Widdowson Safety Services (Phone 2425).

8:9 Experience gained and information gathered as a result of previous use.

8:10 Suppliers 'hotlines' for use in case of accident.

Merck Ltd (BDH) - (Phone 0800 - 223344)
Aldrich (Sigma) - (Phone 0800-272572) (FAX 0800-378785)
Fisher Scientific UK (Phone 01509 231166)

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9. WORKS OF REFERENCE

9:1 Regulations etc

* Safety In Biological Fieldwork - Guidance Notes for Codes of Practice. David Nicols. Institute of Biology. (Dr C Ferris's Office)

* General COSHH, Carcinogens and Biological Agents Approved Codes of Practice. HSE Books 1995

* Control of Substances Hazardous to Health Regulations 1994 Approved Codes of Practice
ISBB 07176 0819 0; £6.75

* COSHH assessments; a step by step guide to assessment and the skills needed for it.
ISBN 0 11 885470; HMSO; £4.00

* COSHH - An open learning course.
ISBN 07176 0329 6; HSE; £10.00

* COSHH ASSESSMENTS; Guidance on preparation of assessments.
Leicester University Safety Office

* Introducing COSHH)
* Hazard and Risk explained) Free leaflets published by the HSE.
* Introducing Assessment)

9:2 **Substances Hazardous to Health**

Carcinogens - Notes for Guidance

* Chemical (Hazard Information and Packaging for Supply) (Amendment) Regulations 1996, SI 1996 No 1092
ISBN 011054570 2; HMSO: £2,80

* Occupational Exposure Limits 1996. Guidance note EH40/96 from HSE.
ISBN 0 7176-1021-7; HMSO; 1993; £6.50

* Hazard Data Sheets
BDH Publication; product No. 57053 15

*** Available in the Biology Department**

9:3 **Risk Assessments for Procedures not covered by COSHH**

The department has designed a Risk Assessment Form (copy in front of book) for general use. It is suitable for laboratory procedures involving hazards other than those covered by COSHH and for fieldwork. All activities should be covered by a Risk Assessment Form. This includes practical classes for undergraduates. (The risk assessment form is available on CFS.)

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10 . PHYSICAL HAZARDS

10:1 **Electrical**

10:1:2 The following procedures have been formulated with reference to the University's "**Code of Practice for Electrical Safety**". For further reference consult the Code of Practice which you will find in your laboratory's safety file.

10:1:3 Any electrical equipment whether obtained commercially or constructed within the University must conform with the minimum manufacturing standards as detailed in Section B.8 of the Code of Practice for Electrical Safety.

10:1:4 All mains powered electrical equipment that is not permanently connected to the electricity supply, must only be connected to the supply by means of the right type of plug for the socket that is to be used. The plug must have the correctly rated fuse in it and be correctly wired to the power lead. If you are unsure how to connect a plug to a power lead or what size of fuse is required, ask a trained PAT tester to do it for you.

10:1:5 Do not overload sockets by having too many pieces of apparatus plugged in to the same socket. If you need to use the same socket for several pieces of equipment use a distribution board rather than a two way adaptor.

10:1:6 Do not wire two pieces of equipment to the same plug. Each item of equipment must have its own plug.

10:1:7 If a power lead needs to be extended then the extra cable of the correct size for the load must be connected to the original cable by the means of a cable connector that has provision for clamping the two ends of the cable so that the cables cannot be pulled undone by tugging. Flexible power leads must not be extended by means of terminal blocks or by twisting the ends of the wires together and binding with insulating tape.

10:2 Portable Appliance Testing

10:2:1 Each item of electrical equipment that is plugged into a mains socket via a 13 amp plug must be safety tested regularly and a test record maintained.(See Code of Practice for Electrical Safety, Section A.3 and Section B.7) The condition of the power lead, the plug, earth continuity, insulation and function must be checked and records maintained in the laboratory file and on CFS. This is a legal requirement. The Chief Technician is in charge of the electrical safety testing programme. Steve Ison will co-ordinate the record keeping and has the authority to take out of use any item of equipment that fails to meet the requirements of the electrical safety test until the fault is rectified.

10:2:2 Equipment should only be tested by someone who has been on the electrical safety testing course organised by the Staff Development Unit of the University. If you do not have a suitably qualified person within your group to perform the test and if an item of equipment has not been tested during the last 12 months, get a PAT tester to test it for you. The date of the last test will be on the little green "Tested" sticker somewhere on the outer casing of the equipment.

ONLY USE ELECTRICAL EQUIPMENT THAT HAS A VALID TEST STICKER

10:2:3 The Biology Safety Committee in conjunction with Maurice Andrews (University Portable Appliance trainer) has produced the following three frequency of testing recommendations for portable appliance testing (PAT) as of November 1997 with current known legislation. A copy of the Insitute of Electrical Engineers testing guidance book is kept by Maurice Andrews.

i) **Constantly used items for short duration**: Kettles, tea urn, microscopes, mixers, water-baths, hot plates/stirrers, etc.

Visual Inspection & P.A.T. every year

ii) **Permanent or semi-permanent long running equipment:** Fridges, freezers, incubators, pumps, shakers, ovens, autoclaves, flow-hoods, growth/controlled cabinets, water purifiers, light units, timers and extension leads connected to any of the above.

Visual Inspection every year. P.A.T. every 2 years

iii) **Information Technology and electronic equipment:** Computers and associated equipment, Video and associated equipment, electronic meters, balances, spectrophotometers, etc.

AND

Double insulated equipment: Lamps, fans, slide projectors, etc.

Visual Inspection every year. P.A.T. every 4 years.

We require that all items used for teaching should have been tested within the last year.

N.B. The minimum recommendation for fuses used should be 3 amp(<700W) or 13 amp(>700W).

10:2:4 Guidance on Portable electrical equipment testing can be found in the HSE Booklet "Maintaining portable electrical equipment in offices and other low-risk environments" (11/96 Edition).

10:2:5 Detailed instructions for the safe operation of specific types of electrical equipment, e.g. electrophoresis equipment, electric fishing equipment, microwave ovens, waterbaths etc., will be found in the appropriate laboratory safety manual.

10:3 Use of Ultra-Violet Light Sources

10:3:1 UV light presents two hazards to health - damage to eyes
- damage to the skin

10:3:2 The eyes can be damaged after even a short exposure. The symptoms (severe irritation and even blindness) often do not occur until several hours after exposure. Medical attention must be obtained in cases of suspected exposure. Carcinoma of the skin can occur after longer periods of exposure to UV light.

10:4 Precautions

10:4:1 UV radiation sources must carry the appropriate warning label.

10:4:2 Wherever possible, UV light sources, eg transilluminators, should be shielded with light-tight boxes constructed of opaque material (wood etc) or transparent glass or plastic (perspex). Particular care should be taken that UV light cannot pass through seams or entry/exit points.

10:4:3 The following precautions must be taken when using a UV light source:

a) Wear special UV goggles, or preferably, a full-face plastic UV visor, and ensure protective shields are in place.

b) Cover **all** exposed skin by wearing a laboratory coat, gloves etc. as unprotected skin has been burnt.

c) Hand-held UV lamps are sometimes necessary for certain applications and when required should be used with special care to avoid skin and eye exposure.

d) Position signs outside the room warning of UV radiation, and never enter such a room when the UV light is in operation.

10:4:4 UV light sources give off ozone and should only be used in well-ventilated areas.

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11. FAULTY EQUIPMENT

All equipment in the department, whether electrical or mechanical, can develop faults at any time. All faulty equipment is potentially dangerous and hazardous to life.

11:1 If faulty equipment is not removed from use and that fault reported then:

11:1:1 people may unknowingly be using faulty equipment and their lives may be put at risk;

11:1:2 it cannot be repaired;

11:1:3 a small inexpensive repair may become a large expensive repair.

11:1:4 By ignoring or by not reporting faulty equipment you are acting very irresponsibly and **may well be contravening the Health and Safety at Work Act 1974.**

11:2 Therefore, if you see faulty equipment in use, or if an item develops a fault while in use, then the following procedures must be carried out:

11:2:1 If it is safe to do so, isolate and make safe the faulty equipment.

11:2:2 Attach securely an "OUT OF ORDER" notice to the equipment.

11:2:3 **For electrical equipment:**

11:2:4 If an item of electrical equipment goes wrong report it to a technician, do not attempt to repair it.

11:2:5 Report the fault both verbally and in writing. The written memo should be put in the "faulty equipment" tray, which is on **Malcolm Pratt's** desk. The verbal report should also be given to **Malcolm Pratt** or to any senior member of the technical staff.

11:2:6 **DO NOT IGNORE FAULTY EQUIPMENT REPORT IT.**

11:2:7 **DO NOT ATTEMPT** to repair faulty equipment yourself. Obtain expert advice.

11:2:8 All repaired equipment has to be checked as safe by the technical staff before re-use.

11:2:9 "Out of order" notices are available from the Chief Technician's office.

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12. DEPARTMENTAL WASTE DISPOSAL

12:1 General Points

12:1:1 All empty chemical bottles MUST be returned to the special box in the open stores (room 341) in order to remove them from the Chemical Stock Index.

12:1:2 If small contaminated bottles are included in Burn bins for disposal, their tops MUST be removed.

12:1:3 Aerosol cans MUST NOT be included in waste to be incinerated.

12:1:4 Although unmarked containers, bottles and glassware should not contain hazardous materials, remember that mistakes can be made and care should be taken with all unlabelled material.

12:1:5 Before taking final leave of the Department you MUST return all your unused and part used chemicals to a member of the technical staff. You MUST also safely dispose of all your stock solutions.

12:1:6 Collection of liquid waste for disposal by University Contractor:

a) Liquids are collected in empty cleaned, wide necked Fi-Safe (plastic coated) Winchester bottles with all manufacturers labels removed. They are labelled "BIOLOGY DEPT - SOLVENT WASTE" and have a tie-on label provided so that disposal can be listed. These bottles are available from the open store (room 341). Use of empty bottles with defaced manufacturers labels is NOT acceptable.

b) **Chlorinated solvents and mixtures must be kept separate from other solvents.** See also d) below.

c) List all disposals in the bottle on the tie on label. Give name of chemical and volume of disposal.

NB: An entry "60% Acetone - 400 ml" does not indicate the make up of the remaining 40%.

d) Before disposing of liquids into waste bottles, be aware that incompatibilities between chemicals can occur. This information is given on Hazard Data sheets. Check this before disposal.

e) When full, take the suitably labelled bottle (in Winchester carrier) to one of the cabinets reserved for waste solvents. These are located in most laboratories. Disposal will be arranged by the technical staff.

f) If you are producing large amounts of any individual liquid waste, it may help to dedicate waste bottles to these liquids.

g) If you are intending to produce radioactive solvent waste special procedures have to be followed. Discuss with DRPO or RPS before commencing work.

SOLID WASTE	**DISPOSAL ROUTE**
Non-contaminated paper and packaging and uncontaminated gloves. Polymerised gels adequately wrapped (inside used glove etc)	Lab waste bins or black plastic sacks
Contaminated paper, plastics, pipette tips, disposable pipettes and gloves	Blue biohazard bags which MUST be packed in black sacks AFTER autoclaving
Sharps, needles, fine broken glass, contaminated plastics and contaminated gloves	Burn bins for incineration
Broken glassware (if contaminated, may require decontaminating before disposal)	Glass bins
ORGANIC WASTES - ANIMAL CARCASSES, DISSECTION WASTE ETC	**DISPOSAL ROUTE**
Uncontaminated small amounts of soft tissue, e.g. the odd fish, salamander etc.	Dispose down one of the "Disposamatics".
Large amounts, after classes etc., or chemically contaminated carcasses and tissues.	Place initially in black sack and then in yellow polythene sack and store in the freezer in Lab 205. The bag labels must contain the following information, Dept., Lab No. and Date. The bag must be securely sealed. Key to freezer can be obtained from Jean Liggins. All items must be logged in and a Clinical Waste Record Sheet completed. On the following Monday afternoon the bags must be transferred to the yellow clinical waste container at the Adrian building goods entrance. The key is available from the porters room on the ground floor. Make sure that the key is returned after use. The Clinical waste container is cleared by contractors on Tuesday mornings.
Carcasses and tissues contaminated with radioisotopes.	See Radioactive Wastes.
Freshwater collections and rubbish.	Strain through a collecting net bag over the designated sink in Lab 306.
LIQUID WASTE	**DISPOSAL ROUTE**
Acids Aqueous solutions	Flush down sink, diluting greatly with water
Flammable solvents (small volumes miscible with water)	Flush down sink diluting greatly with water. Leave tap running for 5 mins minimum after disposal
Flammable solvents (large volumes miscible with water) Flammable solvents (immiscible with water) Chlorinated Solvents (keep separate) Toxic Solutions	All these disposals are completed by the University Waste Disposal Contractor, see General Points number 6
ELECTROPHORESIS WASTE	**DISP OSAL ROUTE**
Waste gels.	Place in yellow plastic refuse sacks in the labelled plastic bin. The bag will be removed at intervals by the technical staff and sent for incineration.
Waste buffer containing Ethidium bromide.	Treat with Sodium Hypochlorite solution (Bleach) prior to disposal down a sink.
Pipette tips contaminated with Ethidium Bromide.	Place in a cinbin. See Laboratory Safety Manual for Lab 331, Ethidium Bromide data sheet.

13. LABELLING OF HAZARDOUS MATERIALS

Under the Classification, Packaging and Labelling Regulations (1984) all containers of hazardous materials carried by road must be labelled with hazard warning symbols and guidance phrases. Most companies (but not *all*) now provide this information on all containers of hazardous materials in the form of labels.

13:1 Description

The symbols used either indicate physical property or hazard to life and are ranked in priority order according to type:

a) EXPLOSIVE has priority over OXIDISING has priority over FLAMMABLE.

b) TOXIC has priority over CORROSIVE has priority over HARMFUL.

The GUIDANCE PHRASES are also of two types:

a) RISK phrases which indicate the HAZARD, eg "toxic by inhalation".

b) SAFETY phrases which advise on how to minimise RISK, eg "keep away from heat".

13:2 Use

A maximum of two symbols only can be used, one of each type. The symbol chosen should be the one of highest priority.

Thus a material which is toxic and corrosive should only be labelled as toxic. Priorities apply even within categories which share the same symbol, thus a HIGHLY FLAMMABLE material should not be labelled as merely FLAMMABLE.

NB: THE TERM INFLAMMABLE IS OBSOLETE AND SHOULD NOT BE USED.

13:3 Guidelines for Labelling Laboratory Stocks of Hazardous Materials

13:3:1 All hazardous materials should be labelled with the appropriate symbols and guidance phrases.

NB: Do not rely solely on information provided on the supplied label as this may be inadequate, especially on materials supplied from outside the UK. Use data sheets etc.

13:3:2 If hazardous material is dispensed or transferred into another container, the new container MUST by labelled with **AT LEAST** the same safety information as the original (even if diluted), and should also indicate the source of the original material.

13:3:3 Containers used for dispensed stocks of hazardous material **MUST be supplied with NEW labels.** It is illegal to overwrite or re-use old labels, these must be soaked off before any container is re-used.

13:3:4 Labels should preferably be covered by a clear plastic laminate to prevent legends being destroyed by spills etc. Blank labels are available from the Chief Technician.

13:3:5 When bottles are tipped for pouring, the label should be kept uppermost to avoid spills onto labels. Any drips from the bottle neck should be wiped away.

13:3:6 Labelling of hazardous materials applies equally to waste materials, especially those which are to be disposed of by an outside contractor.

Check the correct labelling of mixtures of hazardous materials. Do not assume that the properties of a mixture are the sum of its constituent parts, i.e. two HARMFUL chemicals may be HIGHLY TOXIC when mixed. Use date sheets to check incompatibilities.

13:4 Hazard Symbols

	EXTREMELY FLAMMABLE HIGHLY FLAMMABLE FLAMMABLE	Flash point < 0°C Flash point > 0°C & < 21°C Flash point > 21°C & < 55°C
	VERY CORROSIVE CORROSIVE (CAUSES BURNS)	Skin necrosis in 3 minutes or under Skin damage in under 4 hours
	IRRITANT HARMFUL	Non-corrosive that will cause inflammation in under 4 hours exposure Toxic substance with an LD75 of 0.2 to 2.0g/kg body weight, ie a toxic dose of ca. 14g for an adult male at the lower limit
	TOXIC	LD75 > 25mg & < 250mg/kg body weight, ie toxic dose of ca. 1.8g at the lower limit
	VERY TOXIC	LD75 < 25mg/kg body weight, ie toxic dose of < 1.8g for an adult male.

The other two symbols are OXIDISING and EXPLOSIVE, neither has any variant or qualifer. Both are more relevant to fire service than laboratory worker.

14. HANDLING OF GAS CYLINDERS

Compressed gas cylinders are safe if treated in accordance with the manufacturer's instructions. When handled incorrectly or damaged accidentally, they can be extremely dangerous - large quantities of toxic or flammable gas may be released. Uncontrolled discharge may result in a cylinder becoming jet-propelled by a pressure of up to 2,500 p.s.i.

14:1 Storage

14:1:1 Cylinders must be stored upright and secured to prevent them from falling. Acetylene and propane cylinders must NEVER be stored, or used, horizontally.

14:1:2 Full cylinders should be stored separately from empties.

14:2 Handling and Use of gas cylinders

14:2:1 Do not handle any gas cylinder or remove regulators unless you are physically able to do so and have been properly trained get help if you are in doubt.

14:2:2 Only those cylinders in use should be kept in laboratories, and they must be supported in holders of an appropriate type.

14:2:3 Never roll cylinders along the ground. "Milk churning" on the base is permissible over short distances, but a trolley must be used for transporting cylinders more than a few feet.

14:2:4 Cylinder valves must be **CLOSED** and regulators removed before transportation.

14:2:5 Never drop cylinders or allow them to strike each other violently.

14:2:6 Before fitting regulator, ensure that the adjusting knob is **FULLY RELEASED**. Fit regulator to clean cylinder outlet, right hand for oxygen and permanent gases, left hand for fuel gases. Using only the correct size of spanner, tighten securely.

14:2:7 Never open the valve more than three revolutions one is usually enough, and always open the valve **SLOWLY** with a proper key using only hand pressure. All valves are **OPENED** by turning anti-clockwise and **CLOSED** by turning clockwise. Never force cylinder valves or use grease on valves or threads.

14:2:8 Never tamper with or try to adjust safety devices in cylinder valves or regulators.

14:2:9 Before assembling regulators and fittings, ensure that there are no particles or dirt in the cylinder outlet. WITH THE EXCEPTION OF HYDROGEN, FLAMMABLE OR TOXIC GASES this can be done by opening and closing the valve momentarily, but cleaning the outlet with tissue will usually suffice.

14:2:10 No part of a cylinder should be subjected to a temperature higher than 53°C.

14:2:11 Do not place cylinders where they may become part of an electrical circuit.

14:2:12 Do not smoke, wear oily or greasy clothes, or have any exposed naked flame in any place where compressed gases are stored. Oil or grease may ignite violently in the presence of oxygen, and if under pressure an explosion may occur. Cylinders and regulators should be kept away from possible sources of contamination.

14:2:13 Dangerous conditions can occur from suck-back if an empty cylinder is connected to a pressurised system. **NEVER** attempt to fill an empty cylinder from a full one.

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15. USE OF FUME CUPBOARDS

15:1 All fume cupboards must be fully tested at least once a year (COSHH Regulations), and labelled to indicate that this has been done, and the air flow rate achieved. This should be between 0.5-1.0m/sec with the glass front open to maximum allowable height (500mm).

15:2 Check that the flow rate is suitable for the proposed type of operation. Morgan and Grundy recommend the following values:

General laboratory reagents - 0.50m/sec
Toxic materials - 0.62m/sec
Carcinogens - 0.75m/sec
Very toxic materials - 0.90m/sec

15:3 Always check that a fume cupboard is operational BEFORE commencing work. If any defect is suspected, this must be reported to the Chief Technician immediately, who will inform the maintenance staff.

15:4 Consult others working in the same fume cupboard before starting any procedure to avoid the possibility of adverse chemical reactions taking place.

15:5 Do not set up equipment near the front of the cupboard leave a 15 cm gap and work 15 cm away, using the minimum practicable opening. Avoid rapid movement which will disturb the air flow.

15:6 NEVER sit in front of the fume cupboard.

15:7 Do not leave work unattended, and always display full hazard information in case you are called away.

15:8 Clear away any unwanted equipment and reagents after use and leave the fume cupboard in a clean and safe condition.

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16 . USE OF HEATING DEVICES AND WATER BATHS

16:1 When using any heating block, or heating device which does not emit a visual glow, a safety warning note should be attached and the device positioned away from accidental contact.

16:2 Always ensure that where a heating device has both normal and safety thermostats, both are functional.

16:3 Do not allow containers to boil dry when left unattended on hot plates.

16:4 Ensure that there is adequate ventilation around any heating appliance, removing any dust build-up.

16:5 Never place cold containers such as glass beakers directly onto hot plates.

16:6 Ensure that any mixture heated on a hot plate will not give off toxic fumes when subjected to heat.

16:7 Never heat oil on a hot plate in an open atmosphere.

16:8 Ensure safety gloves are provided and used for lifting off hot containers.

16:9 Never carry hot containers across laboratories from hot plates etc unless protected.

16:10 Always use stirrer bar removers to remove stirrer bars from hot liquids.

16:11 With water baths check if a mercury thermometer is present and take care not to break it.

16:12 Autoclaves

> 16:12:1 Great care must be exercised in using the autoclaves as when they are working they contain superheated steam under pressure. Detailed safety and operating instructions will be found in the Laboratory Safety Manuals for the areas where the autoclaves are operated. If you are in any doubt about operating the autoclaves, seek advice.

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17. FREEZERS, REFRIGERATORS AND CONTROLLED TEMPERATURE ROOMS

17:1 None of the departmental freezers, refrigerators and controlled temperature rooms are spark proof so volatile or materials containing volatile solvents must not be stored in these areas as there can be a risk of explosion due to vapours being ignited from sparks generated by thermostats and compressors.

17:2 The controlled temperature rooms are virtually airtight boxes so the use of techniques and materials that result in the release of toxic, flammable or suffocating vapours (e.g. Cardice or liquid nitrogen) to the atmosphere are particularly dangerous and must be avoided.

17:3 Use insulated gloves when removing materials from the -70^{o}C freezers to prevent damage to the skin of the hands.

18 . INSECT CULTURES

18:1 Fragments of insect cuticle or faeces are highly allergenic. Repeated exposure to insect cultures can lead to asthmatic or other forms of allergic response. Dust masks, gloves and laboratory coats must be worn when handling insects or entering the culture rooms.

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19 . DARKROOMS

19:1 If you are working in a darkroom by yourself, you should inform another worker. When there is a light trap, do not lock the door. Make sure that the red light outside of the darkroom is working to indicate that you are inside.

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20. PROCEDURES IN CASE OF FIRE

20:1 General Fire Safety

20:1:2 All members of the Department should be aware of Departmental fire procedure (see 17:2 below). They should be familiar with the routine and take part in practice fire drills. They should also be familiar with the locations of fire alarms, fire exits, fire fighting equipment in Department and be aware of the room checking system which is run on a voluntary basis by technicians. All this information is given as part of the safety induction training.

Fire doors MUST NEVER be left propped OPEN.

20:2 If the Fire Alarm Sounds

20:2:1 All personnel not involved in either fire fighting or room checking MUST LEAVE THE BUILDING IMMEDIATELY by the nearest safe exit.

20:2:2 Where practicable and safe to do so windows and doors should be closed, gas burners extinguished and apparatus turned off.

20:2:3 Upon leaving the building you should proceed by a safe route to the upper level of the main concourse on the left (Bennett building side) of the steps. This allows the Department to assemble as one group and is also an excellent vantage point for watching the fire!

DO NOT - use lifts, find the nearest stairway;
- attempt to retrieve personal possessions or outdoor clothing;
- re-enter the building until you are told it is safe to do so by the fire brigade or the University Safety Officer.

20:2:4 Sirens are sounded BRIEFLY for test purposes at 12.30 p.m. on the last Friday of each month and at this time no fire drill is involved. If sirens continue to sound treat as for a fire.

REMEMBER IN ALL CIRCUMSTANCES AVOIDING PERSONAL INJURY IS THE MAIN CONSIDERATION

20:3 If You Discover a Fire

20:3:1 **SOUND THE NEAREST FIRE ALARM**

20:3:2 **PHONE FOR THE FIRE BRIGADE** by dialling 9999 or 888 on any University phone or by dialling 999 on a pay phone.

NB Sounding the fire alarm does not automatically summon the emergency services.

20:3:3 Remain calm, give a precise location for the fire, e.g. University of Leicester, Adrian Building, 3rd floor, lab 319.

20:3:4 If anyone is near send them to act as a guide for the emergency services. Inform University of fire by dialling 888. Give location but tell them that the emergency services have been alerted.

20:3:5 **ONLY IF SAFE TO DO SO** attack the fire with the appropriate equipment. Remember a single extinguisher will only cope with a fire that is about the size of an office waste paper bin.

20:3:6 **CALL THE FIRE BRIGADE FIRST**
The fire brigade would rather be called out to a small fire and find it has been extinguished. Therefore if you tackle a fire before calling the fire brigade and cannot control it, valuable time has been lost and a large fire has to be dealt with.

20:3:7 DO NOT ATTEMPT TO FIGHT A FIRE

· if there is any danger of escape routes being obstructed by smoke or fire;
· if there are gas cylinders or chemical stocks threatened by fire;
· if the fire involves burning gases;
· with the wrong sort of extinguisher;
· if after one extinguisher the fire still grows.

20:4 Fire Extinguishers

The types of fire fighting equipment which can be used by staff are fire blankets and portable fire extinguishers. Do not attempt to use the hose reels located near the fire alarm buttons.

Extinguishers are colour coded according to type as below:

Carbon Dioxide

Colour - all black or cream with black band.
Suitable for - fires involving electrical apparatus or flammable liquids and most chemical fires.
Hazards of use - fumes may overcome operator in confined space, danger of frostbite from discharge horn and possible static build up on horn resulting in sparking.

Powder
Colour - all blue or cream with blue band

Suitable for - fires involving electrical apparatus and some flammable liquid fires.
Hazards of use - avoid breathing powder in a confined space.

Water
Colour - all red or cream with a red band
Suitable for - solid fuel fires.
DO NOT USE FOR - fires involving flammable liquids or live electrical apparatus and some chemicals.
Hazards of use - may produce large amounts of steam in use. Not recommended for laboratory situations.

Foam
Colour - all cream
Suitable for - solid fuel fire and flammable liquid fires.
DO NOT USE FOR - fires involving electrical apparatus.
Hazards of use - jet is very powerful and may splash liquid fire onto surrounding area. Stand well back when using.

Halon
Colour - all green or cream with green band.
Suitable for - fires involving live electrical apparatus or flammable liquids.
DO NOT USE FOR - chemical fires.
Hazards of use - operator may be overcome by fumes if operated in a confined space.

Used fire extinguishers MUST be refilled and NOT left in a discharged state. Contact the Chief Technician ('phone 3388) or the Safety Officer ('phone 5046) to arrange for it to be refilled.

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21 USE OF ETHANOL FOR ASEPTIC WORK IN FLOWHOODS

All members of the Biology Department must adopt the following procedures:

21:1 Sterilisation of flowhood and container surfaces

21:1:2 Make sure any Bunsen burners are fully turned **OFF**.

21:1:3 Turn **ON** the flowhood fan.

21:1:4 **Swab** using 70% ethanol, a more effective disinfectant than IMS. Discard the swab immediately into a container of water before transferring it to a bin.

21:1:5 Leave the flowhood fan running for 15-20 minutes **before lighting the Bunsen burner.**

DO NOT USE ALCOHOL SWABS WHILE A BUNSEN BURNER IS ALIGHT IN A FLOWHOOD. NEVER USE AN ALCOHOL SPRAY.

21:2 Flame sterilisation of implements.

21:2.1 Use a minimum amount of IMS (industrial methylated spirits) either in a powder round or a wide mouthed jar.

21:2:2 Use the steel supports provided for the powder rounds and try to contain spills by standing all types of IMS containers in a small metal tray. There is no rim to most flowhood work surfaces and burning alcohol could flow out on to you.

21:2:3 Have a fire-proof lid, half of a **glass** petri dish is ideal, to snuff out an ignited jar of IMS.

21:2:4 **DO NOT** leave implements in IMS containers, as the projecting handles act as levers if accidentally caught by a hand or a sleeve and increase the chance of a spill

21:2:5 Remember:
FLOWHOOD FANS MUST BE ON WHILE BUNSENS ARE ALIGHT

21:2:6 Follow the written protocol for use of Liminar Flow Hoods. A copy is on CFS.

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22 COLLECTION OF LIQUID NITROGEN FROM CHEMISTRY BULK TANK STORAGE VESSEL

22:1 Notes

22:1:2 If you are new to the Department the following procedures MUST BE demonstrated to you by a competent person.

22:1:3 It is unwise to wheel vessels between the Adrian building and the Chemistry building alone.

22:1:4 Dewars being filled MUST NEVER be left unattended.

22:1:5 Do not twist the fill hose when frozen as this will severely damage it. A replacement will cost over £200. Be patient and allow the pipe to defrost.

22:2 Equipment Required

22:2:1 Safety goggles or preferably a safety visor.

22:2:2 Gloves suitable for use with cryogenic liquids.

22:2:3 Adjustable spanner (for closed Dewars only).

22:2:4 Pen to fill in the log book.

22:2:5 Entrance gate key.

22:3 Filling Open Necked Dewars

22:3:1 Put on goggles and gloves. These MUST BE worn throughout the filling procedure.

22:3:2 Ensure that the phase separator (spray unit) is attached to the flexible fill pipe.

22:3:3 Place fill pipe into Dewar.

22:3:4 Open the outlet valve on the storage vessel (labelled valve no.10) until the Dewar is full.

22:3:5 Turn off the outlet valve (valve no.10) and vent the fill hose by opening the pressure relief valve (small valve labelled P.R.V.).

22:3:6 Remove the fill pipe from the Dewar, leave hose tidy and close the pressure relief valve.

22:3:7 Fill in the log book and lock the gate.

22:4 Filling Closed Dewars

22:4:1 Remove the spray separation unit (spray unit) from the end of the fill pipe.

22:4:2 Connect the fill pipe to your Dewar.

22:4:3 Open the fill and vent valves on your Dewar.

22:4:4 Open the outlet valve (valve no.10) on the storage vessel until your Dewar is full (liquid will flow from the vent valve). NB: NEVER POINT VENT VALVE ON YOUR DEWAR TOWARDS PEOPLE OR PATHS.

22:4:5 When full close both valves on your Dewar.

22:4:6 Close the outlet valve (valve no.10) on the storage vessel.

22:4:7 At this point your vessel can be slightly pressurised. This will aid liquid nitrogen removal from the closed Dewar.

22:4:8 Open the fill valve on your Dewar then the outlet valve (valve no.10) on the storage vessel for a few seconds. REPEAT AS NECESSARY - THIS WILL BE DEMONSTRATED.

22:4:9 Close the fill valve on your Dewar and close the outlet valve (valve no.10) on the storage vessel.

22:4:10 Vent the fill pipe by opening the pressure relief valve (labelled P.R.V.).

22:4:11 Disconnect the fill pipe from your Dewar (this may be difficult if the connection is frozen - allow to defrost) and replace the phase separator.

22:4:12 Leave the fill hose tidy and close pressure relief valve (P.R.V.).

22:4:13 Fill in log book and lock gate.

22:5 In Emergency Contact

Keith Wilkinson Chemistry (phone 2114)

OUT OF HOURS EMERGENCY TELEPHONE NUMBER: 0191 4164104 (Statebourne Cryogenic Ltd) AND IS PRINTED ON THE STORAGE VESSEL.

23 CHEMICAL SPILL KIT

23:1 Location

ROOM 345A (the WASH UP ROOM, opposite 306) in a labelled container.

23:2 Contents

2 bottles	SPILLX-A granules for SOME acids
2 bottles	SPILLX-C granules for SOME caustics
2 bottles	SPILLX-S granules for SOME solvents
2 sets	Instructions for SPILLX items
1	Mercury SPILL kit and instructions
1 pair	Goggles
1	Mixing tool and collection tray
1 pair	Extra long gloves
6	Collection and disposal bags
Various	Collection and disposal containers
Various	Labels
1	Dustpan and brush
1 bag	Sand*
1 bag	Vermiculite (inert absorbent)*
2.5kg	Soda-ash (sodium carbonate)*

* For spillages of chemicals not covered by the SPILLX range, the above items marked * are provided. These are items regularly mentioned on chemical data sheets for dealing with spillages of those chemicals.

23:3 Dealing with a Chemical Spill

The presence and removal of a chemical spill in itself can present a variety of hazards and therefore the following points should be observed:

23:3:1 a) FAMILIARISE yourself with the spill kit and its instructions PRIOR TO ITS USE

b) The SPILLX range cannot be used for all chemicals; lists are provided in the instruction booklet.

23:3:2 If you have any doubt regarding your ability to safely clean up a spill, **LABEL, ISOLATE AND EVACUATE** the spill area and **OBTAIN ADVICE** from the supervisory staff, e.g. your LSM, the Safety Officer, your supervisor or any member of staff.

23:3:3 In dealing with any spill always take the following steps:

a) **LABEL, ISOLATE AND EVACUATE** the spill area as necessary.

b) **PROTECT YOURSELF**. Wear adequate protective clothing. **NEVER COMPROMISE LIFE OR HEALTH**. If in doubt report the spill to supervisory staff after performing step 3(a).

c) Obtain help and advice from supervisory staff

NB For very serious spills it MAY be necessary to call out the emergency services to deal with the spill.

d) Identify the spill - use COSHH forms and chemical data sheets for information on how to deal with a spill.

e) Select the correct agent to deal with the spill and proceed as in instruction booklets or on chemical data sheets.

f) Safely dispose, package and label any residues, clean up the area and arrange with the Chief Technician or the technical staff so that items can be replaced quickly.

g) Always report any usage of the kit to the Chief Technician or technical staff so that items can be replaced quickly.

h) Contents of the kit will be checked monthly by the member of staff responsible for the checking of First Aid Kits.

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24 MICROBIOLOGICAL AND TISSUE CULTURE HAZARDS

The department is unlikely to deliberately hold cultures of known human pathogens but bacteria, viruses and fungi may be encountered in the following categories:

a) **Gene cloning and transformation vectors** especially bacteria such as plasmid or transposon containing *Escherichia coli* and wild type or manipulated *Agrobacterium* strains. These are subject to Genetic Manipulation Regulations. Cross contamination must be avoided. (See Appendix 8)

b) **Plant pathogens** used in the study of or promotion of plant defence reactions. Those not indigenous to the U.K. will be subject to MAFF licence conditions and must not be allowed to escape into or outside the laboratory.

c) **Allergenic fungi** associated with air-borne induction of asthma and hay-fever.

d) **Teaching cultures**, some of which have been put into the weakly pathogenic hazard group 2 (see Leicester University "Hazardous Biological Agents" 1991 edition) because they may invade following a puncture wound. Some of these are widely used industrial or experimental moulds or are commonly found in foods such as dairy produce.

e) **Contaminants of unknown identity** on uninoculated media or on existing microbial or plant cultures. These should be considered on the same basis as organisms from environmental samples which all fall into Hazard Group 2 and should be promptly and properly destroyed on detection.

With all the above maintenance and containment of cultures and contaminants should follow **good microbiological practice**. Key points are:

24:1 Cultural

24:1:1 Culture containers should be opened as briefly as possible and only when essential.

24:1:2 Avoid production of aerosols during transfers. Common causes include too much force when discharging pipettes and sputtering when hot scalpels or loops contact agar or liquid media.

24:1:3 Minimise your movements during transfers.

24:1:4 Remember flow hoods are not safety cabinets. Escaped microbes, including spores, will head your way and into the lab.

24:1:5 Cultures, in use or discarded, should **never** be left uncovered.

24:1:6 Spills of microbial cultures or suspensions should be mopped up after addition of a suitable disinfectant, either **Hycolin** (phenolic based) or **Chloros** (essentially Cl-).

24:1:7 **No mouth pipetting.**

24:2 Disposal

24:2:1 **All** discarded microbial cultures, **contaminated cultures** (including plant tissue and organ cultures) and **contaminated unused media** must be **autoclaved at 121°C** for at least 20 minutes before final disposal.

24:2:2 Screw caps on culture containers **must be loosened** (but not taken off) before autoclaving to allow for steam penetration which is essential to the process.

24:2:3 Used plastic ware including petri dishes and pipette tips must be placed in **Biohazard** bags which must be closed with a small amount of tape and then opened immediately before autoclaving to allow for steam entry.

24:2:4 Dispose of all waste immediately after autoclaving.

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25 DEPARTMENTAL VEHICLES

25:1 In Order to Drive the Departmental Vehicle You Must

25:1:1 Possess a full UK driving licence.

25:1:2 Normally be at least 25 years of age.

25:1:3 Have your name and driving history details included on the University drivers insurance policy by providing the Chief Technician with that information.

25:1:4 Have been out in the vehicle for a familiarisation drive under the supervision of a senior member of staff.

25:1:5 Take with you on every journey the vehicle keys, the drivers logbook, the Shell Gold card, the Shell garage directory and the phonecard. The Gold card enables you to purchase fuel and limited other goods at Shell garages or use the Fina garage account on Welford Road opposite the Tigers Rugby Ground for refueling.

NB Individuals MAY be considered for inclusion in exceptional circumstances if not all the above criteria can be met.

25:2 Vehicle Maintenance

25:2:1 A fortnightly check is made on the vehicle by a member of the technical staff. These checks MUST include the following:

tyre pressures	mirrors
tyre condition	vehicle cleanliness
engine oil level	first aid boxes
brake fluid	radiator
clutch fluid	horn
screen wa sh	windscreen wipers
lights and indicators	

25:3 When Driving the Vehicle

25:3:1 The maximum number of passengers you may carry in the vehicle is determined by the number of seat belts.

25:3:2 Seat belts MUST BE WORN by the driver and all passengers.

25:3:3 If you discover a fault while the vehicle is in your care and this fault does not prevent you from safely and legally returning to the University, that fault MUST be reported immediately upon return. A written note in the drivers logbook PLUS a written report MUST be made to the Chief Technician in order that the fault be checked and rectified

25:3:4 If a fault occurs preventing return to the University see "IN CASE OF BREAKDOWN " below.

25:3:5 On completion of every journey fill in the driver's logbook. Drivers name, destination, final mileometer reading and comments (if any) should be entered.

25:3:6 The driver of the vehicle is LEGALLY responsible for the vehicle while it is in their care. You are therefore advised that although the department aims to keep the vehicle legally roadworthy at all times, you should carry out simple checks before starting any journey, report any fault discovered and ensure it has been fixed before starting a journey.

25:4 Garaging

25:4:1 For the Toyota van a lockup cage is provided underneath the side of the Charles Wilson building (Physics building end). The Ford van is garaged at the foot of the slope behind the Adrian Building.

25:4:2 For security reasons the vehicle MUST be returned to the cage or garage after every journey.

25:4:3 CARE must be taken when putting the vehicle into the cage, it will fit in with only an inch or two to spare front and rear!

25:5 Fuel

25:5:1 THE TOYOTA VAN RUNS ON PREMIUM UN-LEADED PETROL, THE FORD ON DIESEL.

25:5:2 The department has an account for fuel at the Fina garage on Welford Road (almost opposite the Leicester Tiger's Rugby Football Ground).

25:5:3 An additional Fina Card is available from the Chief Technician's Office and can be used when travelling around the country. Fuel can be purchased at any Fina, Total or Elf garage.

25:5:4 NEVER ALLOW the vehicle to run out of fuel. This will result in an expensive garage bill. ALWAYS check fuel gauge before starting a journey.

25:5:5 If you need to top up engine oil, ASK FOR SUITABLE OIL. (THE FORD VAN HAS A DIESEL ENGINE.)

25:6 In Case of Breakdown

25:6:1 If you breakdown:

a) on the motorway; using an emergency phone ask the police to connect you to the Green Flag Motoring assistance, tel. (Freephone) 0800 400 600.

b) on other roads; use the Green Flag Freephone number from any telephone box (0800 887766).

25:6:2 For a small repair carried out at the roadside you may be required to pay on the spot for parts used.

25:6:3 If the vehicle requires a large repair, it is probably more sensible and less expensive to have yourself and the vehicle returned to the University using the Green Flag Relay Service. The repair can then be carried out at a local garage.

25:6:4 If possible the department should be informed of any breakdown and kept informed of progress. A list of contact telephone numbers day and night are provided below. A phonecard is kept with the Shell card. If you use the last unit on the phonecard get a replacement from the Chief Technician.

25:6:5 A COPY OF THIS INFORMATION IS KEPT IN THE VEHICLE.

25:7 In Case of an Accident

25:7:1 If the Accident Involves Your Vehicle Only

a) Damage to property (this includes buildings, walls, hedges, road signs, etc) MUST be reported either to the owner of the property or the police.

b) Have you or your passengers been injured? If in doubt obtain medical advice before resuming your journey.

c) Take names and addresses of any witnesses.

d) Before resuming your journey ensure that the vehicle is safe to drive.

25:7:2 If the Accident Involves Vehicles, but not Injury to Passengers or Others

a) If the damage is small, parties will probably only wish to exchange insurance details.

b) Remain calm and polite.

c) Do not admit any liability for the accident. This is for your own benefit.

d) Make a rough sketch of the accident and include approximate distances.

e) Take names and addresses of witnesses.

f) Make a note of registration numbers of vehicles involved.

g) Exchange vehicle insurance details. The details of our vehicle insurance policy (and MOT certificate) are available from the Estates and Services department at Leicester University.(see contact addresses below).

h) If damage is great or if you feel that the accident was caused because the law was broken, then the police should be called to the scene of the accident.

25:7:3 If Injuries are Sustained

a) If you are trained in First Aid by the University you will know exactly the procedures to follow. If not the following points should be observed at the scene of any accident.

b) Do not put yourself at risk.

c) Do not attempt to move a casualty unless absolutely necessary (leave it to the emergency services).

d) Instruct bystanders to warn approaching traffic.

e) Instruct someone to contact the emergency services immediately. If you can give that person written details of location/type of accident then do so. If instructions are verbal ensure that those instructions are understood.

f) Minimise risk of fire by switching off engines, isolating batteries, (if you know how) and forbid smoking in the area.

g) Immobilise the vehicles, apply handbrakes, engage vehicles in gear and/or place blocks under wheels.

25:8 Contact Telephone Numbers

LESLEY BARNETT	**0116 - 2523313**
MALCOLM PRATT	**0116 - 2523388**
PETER SHELTON	**0116 - 2523352**
COLIN FERRIS	**0116 - 2525152**
ESTATES AND SERVICES - DAVID MASTERS	**0116 - 2522505**
GREEN FLAG (FREEPHONE)	**0800 887766 (24 HOUR)**

26 FIELD COURSES AND FIELD WORK

26:1 This document is issued to all staff involved in either field courses or field work. Please note that all project and postgraduate students and non departmental participants of field courses or field work must receive their own copy of this document well before the start of field work. This is the responsibility of the Course convenor/supervisor in charge of the course/work. Students **MUST** be made aware of responsibilities to co-operate in safe working procedures. Teaching at both undergraduate and postgraduate levels should convey an understanding of basic safety requirements. This **MUST** be done by the course convenor/supervisor prior to departure.

26:2 Before Leaving on a programme of Field Work.

26:2:1 A risk assessment must be made and placed in your laboratory's procedures file (for field courses and work overseas special arrangements apply, see Appendices 1 & 3) and a copy lodged with Departmental Fieldwork Safety Adviser. Ensure all necessary **insurance** is taken out.

26:3 Field work (Staff, Post-graduates & Project students)

26:3:1 For each field visit complete the off-site working log in the Chief Technician's room. If it involves solo working arrange a 'Buddy system' (see Appendix 2).

26:3:2 Carry a first aid kit (Appendix 4).

26:3:3 Ensure that you are appropriately clothed and equipped for the environment you will be working in. (Appendix 5).

26:3:4 Be aware of health and equipment hazards likely to be encountered (Appendix 6.).
Follow the Countryside Code (Appendix 7).

26:4 Contact Telephone Numbers

a) On the motorway; using an emergency phone ask the police to connect you to Green Flag Motoring assistance on freephone 0800 - 400 600

b) On other roads; use the Green Flag freephone number from any telephone box.

Hire vehicles will have their own breakdown procedures.

In normal university hours:

Biology Department Office.....0116 2523344
Chief Technician.....0116 2523388
University Switchboard.....0116 2522522
Security Lodge.....0116 2522023

26:4:1 In the event of an accident resulting in serious injury or fatality, during normal university hours the Registrar **MUST** be contacted immediately on 0116 2522419. The Registrar's Office have set procedures covering such events. Out of hours the Control Room at the Security Lodge is manned 24 hours a day. This desk carries a list of contact telephone numbers including the Registrar's home number.

26:5:1 Field Courses

Before leaving the University the course leader **MUST LEAVE** the following information with the departmental secretary where it will be kept in an accessible and obvious place in the departmental office.

a) An agenda of the field course, to include flight/ferry details.

b) A list of **ALL** participants.

c) The name, address and telephone number of the next of kin of every participant.

d) An address and telephone number where any of the party may be contacted in an emergency.
Field course convenors must ensure that **ALL** field course participants have filled in and returned to the convenor the departmental off-site activities medical questionnaire (available from the departmental office or Field Safety Supervisor).

In addition.

e) Each day ensure that precise field locations are left with a responsible person together with your expected time of return. The phrase "If party has not returned by 9.00pm ....." (allow time for non-serious holdups etc.) makes it clear to the responsible person when to alert the emergency services.

f) Always leave a University contact name and telephone number at your lodgings or with the responsible person for use in emergency.

26:6:1 Solo working

If you are undertaking solo fieldwork it is important that you discuss your proposal with your supervisor and the departmental field safety officer and make a thorough risk assessment. Solo work can be potentially dangerous and we recommend that it is avoided. Risk assessment forms for undergraduates undertaking solo fieldwork must be signed by the supervisor and countersigned by another member of staff.

26:6:2 If you have to undertake solo fieldwork then you must operate a 'Buddy system'. That is you MUST carry a mobile telephone (contact Steve Ison, ext. 3313 if you do not have access to one) and telephone a responsible person you have arranged to contact:- 1) when you arrive on site; give an estimated time for leaving and 2) when you leave. If an emergency situation arises whilst you are in the field, telephone the appropriate emergency service. Before leaving to carry out fieldwork be sure that you know the precise location of the field site/s (OS Grid ref.). The emergency services will need to know your precise location if they are to reach you quickly.

26:6:3 Failure to contact your 'Buddy'.
If your mobile telephone is not working call your 'Buddy' from the nearest public telephone when you leave the site. If your 'Buddy' has not heard from you within two hours of your estimated time of leaving the site he/she will contact the nearest Police Station to the area you are working in and report you as missing. The telephone number of the nearest Police Station can be obtained through Directory Enquiries.

26:7:1 Working overseas

Permission from the Head of Department must be obtained before working overseas. When working overseas follow the safety procedures of the institute you are visiting. If none are in place use your common sense and assess the likely hazards and take appropriate action. For overseas work, risk assessment is particularly important. Two to three months before departing ensure that you have had all of the appropriate vaccinations for that country and that you are taking with you any prophylactics you may require whilst you are there (eg anti-malarial tablets). Overseas health information may be obtained from the following sources:-

Medical Advisory Services for Travellers Abroad Ltd 0891 224100

British Airways Travel Clinic 0117 975550

Malaria Healthline 0891 600350

Student Health 0116 2554776

Your GP

General information on health overseas may be found in Travellers Health by Richard Dawood. A copy of this (for reference use only) is available in the Biology Department office.

26:8:1 First Aid

26:8:2 Always carry a first aid kit. It is recommended that all people undertaking field work have completed a course of anti-tetanus injections and are up to date with booster injections. For field courses it is recommended that at least one senior member of a field course has been trained by the University as a first aider to a level accepted by the HSE.

26:8:3 First aid boxes should be identified by a white cross on green background. These are available from the Field Safety Supervisor. The contents of a first aid kit are strictly controlled by the HSE for use in the normal workplace, but for field work it may be prudent to supplement the standard HSE kit. These items might include:

· **whistle, scissors and tweezers**

· **Small notebook and pencil.**
All uses of the first aid kit should be logged and copied into the accident book in the chief technician's room upon return to the department. Replace all used items from the kit immediately upon return.

· **four triangular bandages.**

· **sterile antiseptic wipes**.
Some allergic response has been observed to antiseptics; only use antiseptics if you are absolutely sure that you, or any other person being treated, is not allergic to them.

· **heavy gauge polythene bivvy bag**

· **high factor sun screen/block.**

· **If visiting a Third World country an AIDS prevention blood transfusion kit is recommended.**

26:8:4 It is recommended that the 'First Aid Manual' issued by the St John Ambulance, St Andrew's Ambulance Association and The British Red Cross Society is carried with the First Aid kit. Carrying the manual is no real alternative to proper training, but it is a comprehensive guide to emergency procedures.

26:9:1 Clothing and Equipment

26:9:2 Be suitably clothed both for terrain and weather conditions likely to be encountered. Carry spare clothing for conditions you may not be expecting and for emergency use. Make sure that the vehicle is equipped with a First Aid Kit, a waterproof torch and an accident warning triangle. A course leader MUST issue students with a comprehensive list of all requirements for the course well in advance of departure.

26:9:3 Always carry a map of the area together with a compass and a whistle. Know how to read a map, be able to take a compass bearing from a map and know how to walk that bearing.

26:9:4 Know how to make the emergency distress signal using whistle or torch.

a) 6 blasts of whistle or flashes of torch.

b) Pause for 1 minute.

c) Repeat 6 blasts or flashes.

d) Continue until answered by 3 blasts or flashes followed by 1 minute pause etc.

26:10:1 Health and Equipment Hazards Likely to be Encountered

26:10:2 Sunlight/UV Radiation

Never underestimate the burning power of the sun. A full day in the field even if overcast is a long time to be out without protection, particularly in coastal areas and at altitude. Wear protective clothing, a sunhat can be very useful, make liberal use of a sunscreen agent at a factor rating relevant to time, ferocity of exposure and your skin type. If you are of a sensitive skin type use of a sun block should be considered. See also First Aid Manual.

26:10:3 Effects of Extremes of Temperatures

See First Aid Manual.

26:10:4 Weil's Disease

This disease is usually contracted in slow moving water, stagnant water or areas close to the water contaminated with urine from infected rats. Infection occurs by ingestion, inhalation or through damaged skin. It is therefore important when working in these conditions to observe good hygiene procedures to prevent infection. Wash hands, avoid mouth and nose contact, wash cuts and grazes thoroughly and apply waterproof dressing. If clean water is not available use sterile antiseptic wipes. Early symptoms of the disease resemble flu, therefore if you develop flu-like symptoms soon after working in this environment see a doctor and alert him to possible contact with Weil's disease.

26:10:5 Lyme Disease

This is a spirochaetal infection carried by the sheep tick *Ixodes ricinus*. As well as being carried by sheep it can also be carried by many other vertebrates. They are particularly abundant in rough pastures where sheep and deer graze and will remain in grass that sheep or deer have recently grazed. Prevent yourself from being bitten by ticks, keep skin covered especially if sitting on grassland that is or may have been grazed. Remove ticks quickly if bitten. Using an antiseptic wipe if possible gently lift the body of the tick so that it is in line with its mouthparts then carefully remove the tick with a gentle pulling action whilst twisting in a clockwise direction. It is very easy to leave the mouthparts in the skin. Wash the area well after removal. Alert your doctor to considering Lyme disease in diagnosis of any illness following tick bites. Consult your doctor if you have a rash spreading from the site of the bite.

26:10:6 Toxic Blue Green Algae

Certain algae are capable of producing toxins. During the summer months it is possible for these algae to multiply rapidly producing large concentrations of these toxins. Ingestion of these toxins can cause vomiting, diarrhoea, flu-like symptoms, fever and liver damage. Contact with the skin may cause irritation and rashes. Algal blooms may become washed up onto areas close to water so care should be taken at sides of lakes etc.

26:11 Electrical Equipment and Residual Current Devices

26:11:1 If you are using a piece of electrical equipment powered from mains electricity remote from that supply in the field then an RCD must be used. It must have a residual current rating not exceeding 30mA.

26:11:2 Wherever possible in the field use low voltage equipment. Battery powered equipment will mostly be used in the field from necessity and the use of battery power is encouraged.

26:11:3 All electrical equipment to be used in the field MUST be of suitable construction and MUST be thoroughly checked and tested by a competent person before being taken into the field. This should be arranged through the Chief Technician.

26:12:1 Countryside and the Law

26:12:2 All land belongs to somebody and you MUST have obtained the landowners permission to carry out any field work. This permission should preferably be obtained in writing prior to departure and should clearly state where you may work together with a description of the work to be done. This letter should be carried during field work and MUST be presented courteously to anyone disputing your right to be on that land.

26:12:3 If your field work involves plant/seed collection then senior Botany Department Herbarium staff should be consulted and the following laws, rules and regulations be observed:

· The Wildlife and Countryside Act;

· The Ministry of Agriculture regulations;

· The CITES regulations.

26:12:4 Relevant extracts of the above publications are available for consultation in the Herbarium library .

26:12:5 Obey the country code and respect the countryside. Remember someone's livelihood may depend on that field of grass you trample.

· Keep to paths where possible.

· Close gates after you.

· Do not leave any litter. Take it home.

· Do not climb over dry stone walls.

26:12:6 Always park vehicles responsibly. Do not leave vehicles in gateways or on narrow roads where obstruction to wide and agricultural vehicles could occur. Look after vehicle keys, keep them in a zipped pocket or have another member of the party carry a spare set.

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27 GENETIC MODIFICATION

When do I need to notify activities:

For work involving:

· construction of genetically modified organisms
· acquisition, storage, use, transportation, destruction or disposal of genetically modified organisms under conditions of containment.

27:1:1 **Who do I notify?**

All registrations must go through the local Genetic Modification Sub-Committee (GMSC) in the first instance. subsequently, it may be necessary to forward some applications to HSE and this will involve the payment of a fee by the proposer.

DO NOT SUBMIT PROPOSALS DIRECTLY TO HSE

27:1:2 **How do I make a notification?**

Complete the appropriate form which can be obtained from Diane Warne, the Biological Safety Officer (BSO), Safety Services.

Forward the completed form to the Biological Safety Officer.

Dr Simon Møller is willing to give informal advice.

27:1:3 **When can I start work?**

Local - When the BSO gives the go ahead.
HSE - Dependent on the nature of the proposal - minimum 60 days after receipt of proposal.

27:1:4 **When can I start work?**

Biological Safety Officer, Safety Services (Ext. 2425).

27:1:5 **Genetically Modified Organisms (Contained Use) Regulations 1992**

27:1:6 **Genetically Modified Organisms (Deliberate Release) Regulations 1992**

27:2 PROTOCOL FOR WORKING WITH GM *ARABIDOPSIS*

It is the responsibility of individuals growing GM *Arabidopsis* to ensure that the plants are free of disease and pests and that seeds do not escape into the environment. It is also the responsibility of the individuals growing the plants to ensure that GM material is disposed of appropriately. Departmental technicians will monitor the health and status of plants in the greenhouse but it is not their responsibility to contain or dispose of these plants.

Procedures for growing GM *Arabidopsis* in the *Arabidopsis* Greenhouse

27:2:1 GM *Arabidopsis* plants are not to be routinely transferred to the drying room simply to create additional space in the *Arabidopsis* greenhouse. In exceptional circumstances, such as outbreaks of disease or pests, GM *Arabidopsis* plants may be moved to the drying room but must be contained within high-sided plastic containers following the onset of flowering and during seed set. It is essential to ensure that seeds are contained within the boxes and are not dispersed on to the floor of the drying area.

27:2:2 All reasonable measures need to be taken to ensure that seed from GM *Arabidopsis* plants are not dispersed on to the floor of the *Arabidopsis* greenhouse. When it is necessary to grow GM plants to seed production close to the aisle the plants should be transferred at the onset of seed production into the large high-sided plastic boxes in order to ensure seeds are not dispersed on to the floor.

27:2:3 When GM *Arabidopsis* plants are transferred from the greenhouse to laboratories for seed harvesting they should be contained within the high-sided plastic boxes during transfer.

4th April 2002

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28 BIOHAZARDS

28:1 You should notify the Biological Safety Officer (BSO), Safety Services, of all work involving biohazards. This not only includes research work carried out in your laboratory, but also undergraduate project work.

28:1:1 Further information can be obtained from BSO, Safety Services, Ext. 2435.

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29 Radiation

For **Radiation Protection** see:-

Dr P Jarvis, Departmental Radiation Protection Officer Lab 337/8

Radiation Protection Supervisors:-

Dr R R Harris Lab 304/6
Dr E Rosato Lab 226
Prof D Twell Lab 337/8
Mr Tony Wardle Lab 337/8
Mrs Lesley Barnett - Room 301
