# Answers to learning assessment 1

1. COSHH assessments need to be carried out for all hazardous substances (chemicals) stored in the laboratory.
   **TRUE:** but depth of assessment is based on what you use them for. If you only ever store them, then the assessment is very simple: but you still need to know what to do in an emergency or if some chemical is spilled.
2. COSHH assessments include potential damage to property
   **FALSE:** it is about harm to health
3. Substances that are classified as flammable are required to be included in COSHH assessments
   **FALSE:** The flammability of a substance is a property that subjects it to the DSEAR (2002) Regulations. It does not necessarily mean that a COSHH Assessment is required unless it is also classified as harmful to health.
4. Risk is a product of hazard likelihood and the extent and consequences of exposure
   **TRUE**
5. COSHH applies to hazardous substances, out of or in connection with work related activities within a workplace, such as a laboratory.
   **TRUE**
6. I have just prepared a reagent containing Dichloromethane : Water 80:20. My label only needs to say the chemical names.
   **FALSE:** because it needs warning symbols also, even on a "handmade" label, and a good practice would to be to also include the composition.
7. The SDS is all I need to compile the COSHH assessment
   **FALSE:** it is only an information sheet. What is important is the actual way you will use the chemical.

# Answers to learning assessment 2

## What's the main hazard?

1. Sodium chloride 10% solution: irritant to the skin, especially cuts, and note that this concentration of salt is getting to the point of being able to make you sick
2. Solid Sodium cyanide: acutely poisonous: a few micrograms in your blood stream are fatal
3. Mouldy hay: the mould spores are a respiratory sensitiser and may give you an asthma attack or cause wheezing. In addition, the mould can cause a lung disease "Farmer's Lung" where the mould grows within the lung itself
4. Dichloromethane, a chlorinated solvent which will cause neurological effects, and therefore make you feel dizzy and impair your judgment. It will also defat your skin and is classified as a category 3 carcinogen.
5. Wood Dust: all wood dust is an irritant to the respiratory system. Hard wood dust is carcinogenic. Some hard woods also contain skin sensitisers.
6. Cadmium sulphate: this is a poisonous heavy metal.
7. Nickel: nickel is a sensitiser and as it is often contained in cheap jewellery, individuals wearing such jewellery may get local rashes on their skin
8. Pigeon feathers: these can cause respiratory reactions, and may also have small parasites that can bite or infect the skin
9. Sucrose: too much causes obesity and dental Caries. A large volume of concentrated sugar syrup can cause severe burns.
10. Shower head for emergency shower in the lab: this can harbour Legionella bacteria.

## Now rank the above hazards in terms of (short-term or long-term) potential potency A-J

## (A potentially most harmful/J least harmful to health)

| | | |
|---|---|---|
| 1. | I | Acute, mild but immediate effects |
| 2. | A | Acute, very poisonous |
| 3. | F | Acute effects from some people with the possibility of long term debilitating disease |
| 4. | B | Acute and chronic effects |
| 5. | E | Acute effects for some individuals, and chronic effect for hard woods |
| 6. | C | Acute and accumulative poison |
| 7. | D | Acute sensitiser with chronic long-term effects |
| 8. | G | Similar to the response for mouldy hay |
| 9. | J | In normal use, no particular hazard |
| 10. | H | Acute infection, which can be serious for some of the population |

# Answers to learning assessment 3

1. The cleaner doesn't USE the chemicals in the lab so COSHH assessments don't apply to them.
   **FALSE:** the cleaner needs to know what to do if something goes wrong, and also what to be particularly careful about.
2. There is already a risk assessment covering the undergraduate taught practical so I don't need to do a new one each time.
   **TRUE:** if all is EXACTLY the same, but it's important to thoroughly review if something has changed on a regular basis.
3. Risk assessments are the sole responsibility of the project supervisor.
   **FALSE:** everyone has a role to play in assessing risk although the project supervisor is the most appropriate person to refer to and is in the best position to decide if the assessment is reasonable and accurate.
4. Taking out the laboratory waste at the end of the day is routine so no risk assessment is needed.
   **FALSE:** it is an activity and as such requires assessment.

# Answers to learning assessment 4

## 1. Selection of control measures

Let's take the example of killing the weeds on your pathway using a standard weed killer: sodium chlorate. How do we go about working out what the risk is and how to protect ourselves?

Select the three most appropriate measures from the following list. Do this using the COSHH hierarchy (assign the numbers 1, 2 & 3 to the following options with 1 being the most important).

**Answers:**

(6) 1 Choose an alternative weed killer (but only if it's LESS toxic)

(2) 2 Keep pets and children in doors

(3) 3 Use a spray applicator

## 2. Hierarchy of control measures

For a typical experiment in the laboratory, arrange these control measures

into the order of the COSHH Hierarchy of Control Measures by assigning numbers from 1-8 for each option indicating its position in the hierarchy.

**Answers:**

1. Work in a fume cupboard 3
2. Write an experimental protocol 5
3. Keep the chemicals in a secure cabinet 4
4. Outsource the assay 1
5. Complete a weekly check on fume hood flow 6
6. Wear safety spectacles 8
7. Supervise new member of staff 7
8. Weigh the chemical in a weighing cabinet 2

For clarity the hierarchy is given in order of increasing effectiveness and sustainability, see below:

1. Outsource the assay **ELIMINATE**
2. Weigh the chemical in a cabinet **ISOLATE / CONTROL**
3. Work in a fume cupboard **ISOLATE / CONTROL**
4. Keep chemicals in a secure cabinet **ISOLATE / CONTROL**
5. Write an Experimental Protocol **ADMINISTRATIVE**
6. Complete a weekly check on fume hood flow **ADMINISTRATIVE (Monitoring)**
7. Supervision of a new member of staff **ITIS** Page 2
8. Wear safety spectacles **PPE**

# Answers to learning assessment 5

## 1. Design a laboratory

The small lab shown below will be used for a special project involving the use of carcinogens. The work will be confined to authorised personnel only and needs to be kept secure. Taking the overall shape and size of the lab shown (7 x 4 m) with a door on one side, and window on the opposite side. (Associate each item of equipment below with a letter A-H shown on the laboratory layout below – equipment may be placed in more than one position, this means that there may be some positions that are unsuitable for any equipment).

These are the optimum although other configurations are possible:

1. Fume cupboard Position H (as it is the furthest position from the door, and safest so to avoid people walking into you when you are holding flasks containing chemicals)
2. High level air handling unit Position D high on the wall (as it is out of the way above head height)
3. Lockable fridges Positions C or D (out of the way of the door or could be A,B,C,D,G,F ?depending on the bench layout)
4. Hand wash Position E (next to the exit door so that washing your hands is the last thing you do before leaving the area)
5. Glove box Position G (so that it is next to the fume hood for safe transfer and handling of substances)

## 2. Emergencies: a spill scenario - who are you going to call?

While working in the fume cupboard, you accidentally knock over a flask of liquid labelled "Tim's", cutting your finger on the unexpectedly sharp lower edge of the rotary mixer. The liquid spill is about half a litre and runs out on to the floor.

**So, what will you do?**

Choose the most appropirate action from each of the options presented below

**First?**

a. Try and find Tim? **Last**
b. Faint? **We hope not!**
c. Mop it up? **Second**
d. Deal with your cut? **First**

**And next?**

a. Heave a sigh of relief that you haven't suffered a serious injury?
**First do (c)**
b. Throw the liquid soaked tissues in the bin?
**Second action: clean it up when you have found out what it is**
c. Get First Aid help, put a plaster on and report it?
**First action**

**Which of the following now need to happen?**

a. Tim reprimanded:
**Yes. He should use better labelling needed.**

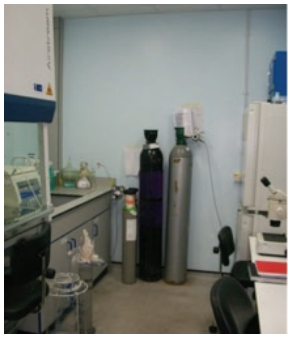
b. A lab inspection:
**Ideal time so as to check standards and systems for reporting and repair of damaged equipment, or checks on equipment so that it is in good order to use.**

c. The risk assessment reviewed
**Yes, to make sure it's accurate or to see if any changes are needed , particularly other assessments applicable for the area when you are sharing workspaces with others (i.e. Tim's flask)**

d. An information session put on:
**Yes, this would be a good idea to reinforce appropriate controls for substances, equipment, first aid measures, and information available and training.**

e. A spill kit assembled:
**Yes, put it together and practice its use and disposal procedures, making sure others are trained that also use the area.**

# Answers to learning assessment 6



## 1. Spot the workplace hazard on the photograph of the laboratory.

How many hazards can you spot in the following photograph?

Answer: **a. 1**

1. Unrestrained gas cylinders in lab.

## 2. Spot the workplace hazard on the photograph of the waste bin.

How many hazards can you spot in the following photograph?

Answer: **b. 2**

1. Overfull bin
2. Incorrect waste container

## 3. Spot the workplace hazard on the photograph of the bench.

How many hazards can you spot in the following photograph?

Answer: **c. 3**

1. Inadequately labelled chemicals in bottles
2. Poorly stored paperwork on electric units
3. Untidy workplace

## 4. Spot the workplace hazard on the photograph of the in the fume cupboard.

How many hazards can you spot in the following photograph?

Answer: **e. 5**

1. Clutter (untidy workplace can lead to accidents and can also affects extraction performance in the fume cupboard)
2. Badly stored PPE (incorrectly stored and the Lab coat is also hanging on a gas tap
3. Drawers open under the front
4. Trailing electrical lead
5. Wash bottles positioned so you must stretch right inside the retrieve them

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# Answers to Final Learning Assessment

## Final learning assessment (Module 9)

1. The Health and Safety at Work Act prohibits dangerous activities.
   **FALSE:** There are no prohibitions. You determine resrtictions by assessing risk.
2. HSE are the safety regulators.
   **TRUE:** The Health and Safety Executive write , review regulations, produce research and enforce the law.
3. All accidents must be recorded.
   **TRUE:** All accidents however trivial must be recorded, but only Recordable Injuries, Diseases and Dangerous Occurences (RIDDORs) must be notified to the enforcement agencies.
4. HSE can shut you down if you haven't done a risk assessment.
   **TRUE:** If you are in breach of regulations they can take enforcement action and issue an improvement or prohibition notice. They are unlikely to take such action unless there is a serious risk of personal injury.
5. COSHH is about assessing the risk exclusively in relation to chemicals.
   **FALSE:** it is about substances hazardous to health and it includes chemicals, preparations, paints, cleaning materials, pesticides, metals, insecticides also about biological agents such as pathogens. Substances hazardous to health come in many forms e.g. solids, liquids, vapours, gases, dusts, fibres, fumes, mist and smoke.
6. Someone else in the lab uses the same solvent mixtures as I do so although my assay is a little different I don't need to do risk assessments because its already been done.
   **FALSE:** COSHH is activity based so it depends what you are doing with the chemicals.
7. Mouldy mugs are health hazards.
   **TRUE:** Technically yes, as moulds are a substance hazardous to health
8. Health surveillance means I must have a yearly medical.
   **FALSE:** It all depends on what your work involves. However, it is more likely to mean a lung function test, or a self report
9. I have to accept that work is making me stressed, but that's just modern life.
   **FALSE:** Heath & Safety at Work Act requires that the employer ensures the heatlh safety & welfare of employees and that included mental health
10. I've finished with my aqueous/solvent mix now so I can tip it away down the sink followed by lots of water.
    **FALSE:** It may be possible although it is very unlikely to be acceptable. Know and follow your waste disposal rules
11. Security Patrollers don't need to know what safety signs mean as long as they don't touch anything.
    **FALSE:**The hazard may be airborne or they may have need to deal with an emergency involving chemicals or come in contact with a spill.
12. I must do an individual COSHH assessment for every single chemical I use.
    **FALSE:** It depends on use: one activity using 10 chemicals needs only one assessment