Answers to module 2

Learning assessment 1

Match the pictogram to the hazard.

	Answer
	g. Explosive
	a. flammable
	h. oxidising
	c. Compressed gas
	e. Corrosive
	d. Toxic
	f. Irritant
	i. Health hazard
	b. Damaging to the Environment

Answers to module 3

Learning assessment 2

1. Hazardous area classification zones 0, 1 and 2 are used for explosive atmospheres formed of combustible dusts.
   False: Zones 0, 1 and 2 are used for **explosive atmospheres formed of flammable gases, vapours or mists**. Zones 20, 21 and 22 are used for **explosive atmospheres formed of combustible dusts**.
2. When a particular area has received hazardous area classification, it needs to be marked with the approved sign at the main entrance only.
   False: it needs to be marked at **each** entrance to that area with the approved sign, and everyone needs training in the special precautions to be adopted when working in that area.
3. DSEAR: If precautions already used are adequate to prevent fire and explosion risks to laboratory workers, then there is no need for zoning.
   True: There is no need for zoning if adequate precautions are already in place. However, a decision in a written risk assessment not to zone the laboratory must be justified.
4. It is OK to store chemicals in fume cupboards.
   False: It is poor practice to store chemicals in fume cupboards. This practice results in additional unnecessary risks. In addition to the additional chemical risks, there are the risks associated with carrying out laboratory work in a messy or cluttered environment. It also reduces the efficiency of the air flow within the fume cupboard.
5. Personal Protective Equipment (PPE) should be used as the first line of defence.
   False: PPE is the last line of defence. The hierarchy of controls is as follows: Eliminate, reduce, solate, control, use of administrative controls (procedures), instruction/supervision/training and finally PPE.
6. When using a small of amount of a flammable liquid (up to 50 ml) the consequences of a spill are likely to be trivial.
   True: Quantities up to about 50mls can be mopped up, and if they ignite, so long as the fire does not quickly spread, they may well burn out before anyone is at risk, or before a laboratory worker could take any action to extinguish a fire.
7. In the case of hazardous areas and dangerous substances that have a fire and explosion risk, it is generally an expectation that maintenance operations must be carried out under a 'Permit to Work System'.
   True: A Permit to Work system may be required and this will be documented and include the nature and location of the work, identify the hazards, and any residual hazards, and any extra hazards introduced by the work itself.

Answers to module 4

Learning assessment 3

1. Interactions of acids with hypochlorites could liberate chlorine.
2. Interactions of acids with cyanides could liberate hydrogen cyanide.
3. Interactions of acids with alkalis generate heat.
4. Interactions of acids with sulphides generate hydrogen sulphide.
5. You will find information on chemical hazards on the Safety Data Sheet.
6. Mixtures of flammable vapours will only burn if the fuel concentration lies within certain limits. The minimum concentration of fuel in air is called the lower explosive limit and the maximum is the upper explosive limit.
7. Aerosol cans - should not be overheated, and should be stored in small quantities inside a mesh/well ventilated container.
8. Oxidising and organic peroxides can cause very rapid run-away exothermic fire/oxidation reactions with materials not normally considered combustible.