Tutors Assignment Correction Guide

Module 8 Safety

Unit 8.2 Hazardous materials

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This guide is to assist you in the correction of the assignments for this unit.

If more than one tutor is involved with Student Support in your institution, it will also assist in ensuring that there is a consistency in the weighting of assignments, and questions within assignments.

The Core Curriculum is designed to be offered utilising competency standards, so the elements that need to be included in answers are specified in the guide. It will therefore assist those who wish to use a competency assessment of Completed or Incomplete.

It is particularly important in the Caribbean to ensure that the assignments are assessed as indicated in the guide, as regional recognition is an ultimate (and desired) outcome.

Assessment Instrument

Module 8 Safety

Unit 8.2 Hazardous materials

Assignment No. 8.2 - 1

The teacher trainee has successfully:

- ❑ defined in accordance with international regulations, hazardous materials
- ❑ identified commonly used hazardous materials
- ❑ stated the precautions for handling identified hazardous materials
- ❑ stated the precautions for storage of identified hazardous materials
- ❑ identified international codes and symbols for hazardous materials
- ❑ stated the meaning of each identified code and symbol
- ❑ stated appropriate action to be taken in given examples of emergencies.

Assignment No. 8.2-1

To be completed and returned to your Tutor for assessment.

This is an Open Book assignment and you may refer to whatever resources you have at your disposal.

Name: _____ Due Date:_____

Question 1

What are hazardous materials?

1 mark

Question 2

Using a tick (✓) mark, check the items listed below that are hazardous materials.

2.1 ☐ acid

2.2 ☐ electric drill

2.3 ☐ welding fume produced during welding

2.4 ☐ piece of wood

2.5 ☐ wood dust produced during sawing

2.6 ☐ solvent

1 mark each – 6 marks

Question 3

What are the 6 main hazard categories that hazardous materials can be classified under?

3.1 _____

3.2 _____

3.3 _____

3.4 _____

3.5 _____

3.6 _____

1 mark each – 6 marks

Question 4

What are the 3 pieces of information that a label tells you?

4.1 _____

4.2 _____

4.3 _____

1 mark each – 3 marks

Question 5

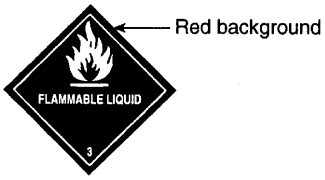
What is a Material Safety Data Sheet (MSDS)?

1 mark

Question 6

What do the following signs tell you?

6.1



6.2

2 marks each – 4

Question 7

What are the 2 main reasons why hazardous materials need to be stored and handled correctly?

7.1 _____

7.2 _____

1 mark each - 2

Question 8

Attached at the end of this assignment is an example of a Material Safety Data Sheet (MSDS) for Material X.

8.1 From the MSDS, what are the health risks of using Material X?

4 marks

8.2 When storing Material X, what precautions are you going to take?

5 marks

8.3 What precautions are you going to take when you are handling Material X?

5 marks

8.4 In your store you have a container of hydrogen peroxide, which is classified as a Class 5 Dangerous Good. Is it safe to store Material X next to the hydrogen peroxide?

1 mark

8.5 If you accidentally spill Material X on yourself, what would you do?

1 mark

8.6 If there was a spill of Material X, what would you do?

5 marks

8.7 If there was a large fire involving Material X, what would you do?

5 marks

8.8 If it was a small fire, what type of fire extinguisher would you use?

1 mark

Total: 50 marks

MATERIAL SAFETY DATA SHEET

Company:	ABC Ltd
Address:	123 Practice St, PO Box 456, SOMEWHERE
Telephone number:	123 4567
Emergency telephone number:	765 4321

PRODUCT IDENTIFICATION

Product Name:	Material X
Other Names:	
Manufacturers Product Code:	MatX
UN Number:	2468
Dangerous Goods Class:	Class 3
Hazchem Code:	2[Y]E
Use:	xxxxxxxxxxxxxxxxx

Physical Description/Properties

Appearance:	clear, colourless liquid with aromatic odour
Boiling Point/Melting Point:	xxx °C
Vapour Pressure:	xxx mm of Hg at 25°C
Specific Gravity:	xxx
Flashpoint:	xxx °C
Flammability Limits:	xxx %
Solubility in Water:	xxx g/L

Ingredients

Chemical Name	CAS Number	Proportion (%)
Material X	987-65-4	99%
Other	567-89-4	1%

HEALTH HAZARD INFORMATION

Health Effects

Acute exposure

Inhalation:

May cause irritation of the upper respiratory tract. Symptoms of over-exposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e.g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.

Ingestion:

Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.

Skin Contact:

Causes irritation. May be absorbed through skin.

Eye Contact:

Causes severe eye irritation with redness and pain.

Chronic Exposure

Reports of chronic poisoning describe anaemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, and dermatitis. Exposure to material X may affect the developing foetus. Harmful by inhalation; at 10 ppm may cause headaches and dizziness, 250-500 ppm difficulty in breathing, 500 pm unconsciousness leading to death after 30 minutes.

First aid

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A DOCTOR IMMEDIATELY.

Ingestion:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

Skin contact:

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a doctor immediately.

Eye contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

PRECAUTIONS FOR USE

Exposure standards:

Material X 40 ppm

Engineering controls:

Use only in a well ventilated area.

A system of local and/or general exhaust is recommended to keep exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.

Personal protection:

If the exposure limit is exceeded, a half-face organic vapour respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapour respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Flammability:

Highly flammable.

Use in a well-ventilated area.

Keep away from sources of ignition.

SAFE HANDLING INFORMATION

Storage and transport:

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any fire hazards. Outside or detached storage is preferred. Separate from incompatibles including heat, flame, strong oxidisers, nitric and sulphuric acids, and chlorine. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be "No Smoking areas". Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapours, liquid); observe all warnings and precautions listed for the product.

Spills and disposal:

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified above. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container.

Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapours, to protect personnel attempting to stop leak, and to flush spills away from exposures.

Fire/explosion hazard

Fire:

Flammable liquid and vapour!

Flammable limits in air % by volume: lel: 3.3; uel: 19

Dangerous fire hazard when exposed to heat or flame. Vapours can flow along surfaces to distant ignition source and flash back.

Explosion:

Above flash point, vapour-air mixtures are explosive within flammable limits noted above. Contact with strong oxidisers may cause fire or explosion. Sensitive to static discharge.

Fire extinguishing media:

Dry chemical, foam or carbon dioxide. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

Special information:

In the event of a fire, wear full protective clothing and approved self-contained breathing apparatus with full face piece operated in positive pressure mode. Water spray may be used to keep fire-exposed containers cool.

Assignment No. 8.2-1

Guidelines for the correction and weighting of questions for Assignment 8.2 – 1.

Question 1

What are hazardous materials?

Hazardous materials are materials that are used or produced that are hazardous to people and property.

1 mark

Question 2

Using a tick (✓) mark which of the items listed below are hazardous materials.

2.1	✓	acid
2.2		electric drill
2.3	✓	welding fume produced during welding
2.4		piece of wood
2.5	✓	wood dust produced during sawing
2.6	✓	solvent

1 mark each – 6 marks

Question 3

What are the 6 main hazard categories that hazardous materials can be classified under?

3.1 *Very toxic*

3.2 *Toxic*

3.3 *Harmful*

3.4 *Very corrosive*

3.5 *Corrosive*

3.6 *Irritant* ***1 mark each – 6 marks***

Question 4

What are the 3 pieces of information that a label tells you?

4.1 *what the material in the container is*

4.2 *whether the material is hazardous*

4.3 *how to use and handle the material safely*

1 mark each - 3

Question 5

What is a Material Safety Data Sheet (MSDS)?

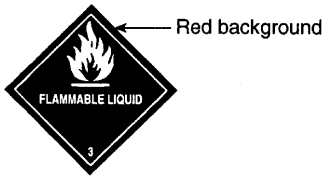
A document giving information that will allow you to use a hazardous material safely and correctly.

1 mark

Question 6

What do the following signs tell you?

6.1



This label tells you that the material is hazardous and classified as a Dangerous Good (Class 3) and that it is a flammable liquid. Therefore it should be kept away from sources of ignition.

6.2

This label tells you that the material is hazardous and classified as a Dangerous Good (Class 8) and that it is a corrosive material. Therefore you should take precautions to make sure it does not come into contact with your skin and other surfaces.

2 marks each – 4 marks

Question 7

What are the 2 main reasons why hazardous materials need to be stored and handled correctly?

7.1 *To prevent exposure to the material.*

7.2 *To prevent fire and explosion*

1 mark each – 2 marks

Question 8

Attached at the end of this assignment is an example of a Material Safety Data Sheet (MSDS) for Material X.

8.1 From the MSDS what are the risks to health from using Material X?

Inhalation:

May cause irritation of the upper respiratory tract. Symptoms of over-exposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e.g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.

Ingestion:

Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.

Skin contact:

Causes irritation. May be absorbed through skin.

Eye contact:

Causes severe eye irritation with redness and pain.

4 marks

8.2 When storing Material X, what precautions are you going to take?

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any fire hazards. Outside or detached storage is preferred. Separate from incompatibles including heat, flame, strong oxidisers, nitric and sulphuric acids, and chlorine. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be "No Smoking areas". Use non-sparking type tools and equipment, including explosion proof ventilation.

5 marks

8.3 What precautions are you going to take when you are handling Material X?

Use in a well-ventilated area.

Keep away from sources of ignition.

Wear personal protective equipment including respirator, skin protection and eye protection.

5 marks

8.4 In your store you have a container of hydrogen peroxide, which is classified as a Class 5 Dangerous Good. Is it safe to store Material X next to the hydrogen peroxide?

No, because hydrogen peroxide is an oxidiser. Flammable liquids and oxidisers are incompatible and must not be stored together.

1 mark

8.5 If you accidentally spill Material X on yourself, what would you do?

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a doctor immediately.

1 mark

8.6 If there was a spill of Material X, what would you do?

- *Clear everyone from the area of the spill and isolate area*
- *Wear appropriate personal protective equipment*
- *Remove all sources of ignition*
- *Arrange for first aid*
- *Ventilate area of spill*
- *Appoint someone to keep all people and traffic away*
- *Contain and recover liquid where possible. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapours, to protect personnel attempting to stop leak, and to flush spills away from exposures.*
- *Alert emergency services in the case of large spills.*

5 marks

8.7 If there was a large fire involving Material X, what would you do?

- *Move everybody out of out of the area and to assembly points, using the evacuation procedure.*
- *Get professional help, such as the fire service and ambulance service and warn them what the material involved is.*
- *Do what you can to help any injured people.*
- *Get responsible people to wait at a safe distance outside the area to keep unauthorised people away and direct the emergency services.*
- *If possible use brightly coloured notices and tape to form barriers at places where people could get into the area.*

5 marks

8.8 If it was a small fire, what type of fire extinguisher would you use?

Dry chemical, foam or carbon dioxide.

1 mark