Cambridge TECHNICALS

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OCR LEVEL 2 CAMBRIDGE TECHNICALS IN SCIENCE

LEVEL 2 UNIT 10 CHEMISTRY OF PRODUCTION

DELIVERY GUIDE

VERSION 1 MARCH 2014

OCR
Oxford Cambridge and RSA

CONTENTS

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INTRODUCTION

This Delivery Guide and Plan has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons. The Plan offers one way to deliver this unit, with suggestions on how many lessons to spend on a particular topic and the resources you could use.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic. The Guide is structured by learning outcome so you can see how each activity helps you cover the specification.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resourcesfeedback@ocr.org.uk.

PLEASE NOTE

The activities suggested in this Delivery Guide MUST NOT be used for assessment purposes. (This includes the Consolidation suggested activities).

The timings for the suggested activities in this Delivery Guide DO NOT relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk.

The latest version of this Delivery Guide can be downloaded from the OCR website.

OPPORTUNITIES FOR ENGLISH AND MATHS DEVELOPMENT

The Wolf Review of Vocational Education recommended that all learners studying post-16 qualifications have the opportunity to further develop their English and maths skills, with the aims of:

- achieving a GCSE in English and/or maths at grade A*-C if they have not already done so or
- making significant progress towards GCSE entry and success if this is some way off for the individual.

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.

OPPORTUNITIES FOR WORK EXPERIENCE

The Wolf Report also recommended that learners have the opportunity to apply their skills and extend their learning outside the classroom through work experience, part time jobs, work shadowing and work placements. There are lots of opportunities within these qualifications to take some of the teaching and learning outside of the classroom and into a work environment. We are working to provide you with resources to support you in achieving this, please visit www.ocr.org.uk shortly for more information.

KEY

English

Maths


Work experience

UNIT 10 - CHEMISTRY IN PRODUCTION

Guided learning hours : 60

Credit value: 10

PURPOSE OF THE UNIT

The UK chemical industry has a turnover of over £57 billion a year and employs nearly 200,000 people. It is one of the country's largest and safest manufacturing industries. By the end of this unit learners will have an understanding of some of the factors involved in producing chemicals on an industrial scale to make all the materials that we rely on to improve our everyday lives. They will be able to outline the factors involved in siting a chemical plant and the choice of process used. They will be able to use chemical ideas to evaluate and explain the conditions used in a process.

Learners will understand the benefits and disadvantages of a chemical plant on the local and national community and be able to explain its impact on the environment. Learners will know how health and safety plays an important role in the operation of a chemical plant and in the transport of chemicals.

Learning Outcome The learner will:	Assessment Criteria The learner can:	Merit	Distinction
1 Be able to describe why a chemical process and its location are chosen	P1 analyse a chemical process to determine how its products are used		
	P2 describe the reasons for the choices made in the siting and conditions for a specified chemical process	M1 compare the suitability of batch and continuous processes for a specified chemical process	
2 Be able to describe the factors that govern the rate and yield of a chemical process	P3 describe the different factors that affect the rate and yield of a chemical process, and explain why the reaction conditions are selected	M2 explain how the rate, in terms of particle collisions, and yield of a chemical process are changed under different conditions	D1 explain how the rate of a reaction is changed in terms of particle collisions and activation energy
3 Know how waste treatment methods can be used to minimise the environmental impact of a chemical process.	P4 describe how to minimise the waste materials that are produced by a specified chemical process		D2 describe the science behind waste treatment procedures
4 Know how the chemical industry maintains a good safety record in the manufacture and transport of chemicals	P5 outline how the chemical industry maintains a good safety record in the manufacture of chemicals	M3 explain the precautions taken in the manufacture of chemicals to maintain a good safety record, and link these to the chemical properties of a chosen chemical	
	P6 outline the precautions needed for the transportation of a chosen chemical	M4 explain why specific actions are taken in the transportation of a chosen chemical, and link these to the chemical properties of a chosen chemical	

P = Pass, M = Merit, D = Distinction

LEARNING OUTCOME 1 – BE ABLE TO DESCRIBE WHY A CHEMICAL PROCESS AND ITS LOCATION ARE CHOSEN

Learning Outcome The learner will:	Assessment Criteria The learner can:	Merit	Distinction
1 Be able to describe why a chemical process and its location are chosen	P1 analyse a chemical process to determine how its products are used		
	P2 describe the reasons for the choices made in the siting and conditions for a specified chemical process	M1 compare the suitability of batch and continuous processes for a specified chemical process	

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
1 Introduction to chemical processes	The tutor could introduce the unit to the learners using the introductory PowerPoint.	5 minutes	
	Learners could start this unit by considering 'How do chemicals affect them?' Learners could carry out some research into the chemicals they may encounter in this unit such as ethanol, ammonia, sulfuric acid and copper. Learners could then produce some webpages / wiki pages /adverts to show why these chemicals are important. As a starting point to this learners could visit a cosmetic shop / local dry cleaners / DIY store etc.	1 hour	P1 analyse a chemical process to determine how its products are used.
	Learners could be given the question 'What things are manufactured in a factory?' Learners could discuss their ideas with each other. Examples are pharmaceuticals, plastics, paints, alcohols. In groups learners could then identify the stages in the production of an everyday object eg a coke can, a plastic bottle or a food packaging, the learners could also try to identify the chemicals/ materials used. Ideas could be presented as a flow chart.	25 minutes	P1 analyse a chemical process to determine how its products are used.
2 Chemical processes	A site visit is an ideal way to start researching the chemical industry but if not possible, websites and videos will provide easily accessible content. A number of contrasting processes should be examined with the focus on the teaching content. Careful choice of an end product can be traced back to a chemical process and the reasons for location and method of manufacture can be examined eg car body traced back to the steel works or a lemonade bottle back to a PET plant. The learner can consolidate and extend understanding by carrying out the following activities based on a chosen different process in the creation of a guide: • Researching the location of the process. • Researching the products of the process. • Outlining the process and investigating the reasons why that particular process is used. • Examining the sustainability of the process. It is intended that as much as possible the activities are linked to studies of a chemical processes that the learner has an interest in. If possible selection of a process should be because of personal experience either through employment, works experience, a site visit or links in the local area.	3 - 4 hours	P1 analyse a chemical process to determine how its products are used. P2 describe the reasons for the choices made in the siting and conditions for a specified chemical process. M1 compare the suitability of batch and continuous processes for a specified chemical process.

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
3 Batch and continuous 	Learners could be shown videos of bulk and fine chemical production http://media.rsc.org/alchemy/videos/sa.mpg, http://media.rsc.org/alchemy/videos/mm.mpg. Learners could describe what they think the differences are between the two processes. Learners could choose a batch or continuous process and produce a short report explaining the stages of production from feedstock to product. This task could be a research task for higher level learners or lower levels students could be given a specific example (this webpage would be helpful for supporting lower level learners http://www.bbc.co.uk/schools/gcsebitesize/science/add_gateway_pre_2011/chemical/batchcontinuousrev1.shtml	1 hour	P1 analyse a chemical process to determine how its products are used. M1 compare the suitability of batch and continuous processes for a specified chemical process.
4 Industrial production of chemicals	Learners could visit a plant or carry out a virtual tour of a plant. For example learners could watch a series of short video clips from http://english.unica.com.br/virtual-mill/video-new/virtual-mill.htm, which shows every stage in the production of ethanol or be taken through the PowerPoint 'Chemical Processing Plant: A Virtual Tour' which covers the production of sulfuric acid http://www.fipr.state.fl.us/pondwatercd/chemical_processing_tour.pdf. The tutor could group the learners and ask them to identify what they think happens at each stage of the production process. The teacher could then lead a discussion with the class and provide learners with the correct details about what happens at each stage. Learners could then discuss in their groups the reasons why the plant is located at this site. Final work could be presented as a large poster, containing a map and clear annotation about what is happening at each stage of the process and why the plant located where it is. This task could be supported by learners having access to the internet for additional research.	1 - 2 hours	P2 describe the reasons for the choices made in the siting and conditions for a specified chemical process.
5 Industrial production of copper	The industrial production of copper is an example of an end product where the method of manufacture can be examined. - Learners could be given the question 'Why is copper important?'. Learners could then discuss this in small groups and produce a list of uses of copper and why it is useful. - Learners could watch the electrolysis animation 'Ions in solution' http://www.bbc.co.uk/schools/gcsebitesize/science/21c/chemicals_in_our_lives/manufacture_chemicalsact.shtml. - Learners could then carry out the electrolysis of copper(II) sulfate solution and to link their findings with the industrial electrolytic refining of copper by carrying out some further research. The class practical 'Electrolysis of copper(II) sulfate solution' http://www.nuffieldfoundation.org/practical-chemistry/electrolysis-copperii-sulfate-solution could be used.	1 - 2 hours	P2 describe the reasons for the choices made in the siting and conditions for a specified chemical process.

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
6 Industrial production of chlorine, hydrogen and sodium hydroxide	Learners could research the electrolysis of sodium chloride solution (brine) and focus on the uses of the products of hydrogen, chlorine and sodium hydroxide and produce a wiki/webpage for non-scientists. More able learners could then complete the practical 'Colourful electrolysis' http://www.nuffieldfoundation.org/practical-chemistry/colourful-electrolysis. In order to summarise this work learners could complete the 'Lesson Element - Electrolysis'.	1 - 2 hours	P1 analyse a chemical process to determine how its products are used.
7 Ethanol production	The industrial production of ethanol is an example of an end product where the method of manufacture can be examined. - Learners could carry out the practical 'Fermentation of glucose using yeast' http://www.nuffieldfoundation.org/practical-chemistry/fermentation-glucose-using-yeast. Learners could make notes on the specific conditions required eg temperature and pH. Learners could then make comparisons between the conditions required for industrial production of ethanol using the information from 'Industrial production of ethanol from sugar cane' http://nsb.wikidot.com/c-9-2-3-12 and how it has been produced in the lab. Learners could describe what has happened during the reaction and produce a summarised description of this process. - Learners could be introduced to a second method used in the production of ethanol - ethene http://www.greener-industry.org.uk/pages/ethanol/ethanol6PM1.htm. In small groups learners could use the 'Lesson Element - Ethanol production', this is a sort card activity that maps out the advantages and disadvantages between both methods of production. These notes could start as a basis for a debate to evaluate the sustainability of the different methods. Learners could then collect additional research information which covers the eight key areas eg will the raw materials run out?, atom economy, waste products, energy costs, damage to the environment, health and safety, benefits and risks, profitability. Lower ability learners could use the notes created from Lesson Element - Ethanol Production, they could then work in a group to produce a balanced argument to present the ideas. The tutor could provide a writing frame for this task.	Variable dependent on which practicals are carried out	P2 describe the reasons for the choices made in the siting and conditions for a specified chemical process.
8 Uses of ethanol 	The tutor could discuss with learners the need for ethanol in the production of other substances eg alcoholic beverages and fuels http://videos.howstuffworks.com/discovery/34874-howstuffworks-show-episode-5-fermentation-video.htm. Learners could produce a poster/PowerPoint detailing the use, waste products, appropriate equations, discussion of atom economy and also the importance of this product. Posters/PowerPoints could be presented to the class and this could prompt further discussion about the environmental effects of each use.	1 hour	P1 analyse a chemical process to determine how its products are used.

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
9 Choosing the right Site 	The tutor could remind learners of their visit/virtual tour. Learners could use mapping tools to highlight areas of the country where there are factories that produce chemicals (with a focus on a speciifc process eg copper production, ethanol production, PET plant). The teacher could then encourage learners to describe reasons for the location; consider disposal of waste, ease of transport, pollution, housing/residential areas, access to raw materials, transport, labour. The teacher tutor could present a scenario such as 'Should the factory be closed?' Learners are to persuade the local government to keep a factory open or explain why it needs to be closed - both aspects should be covered.	2 hours	P1 analyse a chemical process to determine how its products are used. P2 describe the reasons for the choices made in the siting and conditions for a specified chemical process.

LEARNING OUTCOME 2 – BE ABLE TO DESCRIBE THE FACTORS THAT GOVERN THE RATE AND YIELD OF A CHEMICAL PROCESS

Learning Outcome The learner will:	Assessment Criteria The learner can:	Merit	Distinctiion
2 Be able to describe the factors that govern the rate and yield of a chemical process	P3 describe the different factors that affect the rate and yield of a chemical process, and explain why the reaction conditions are selected	M2 explain how the rate, in terms of particle collisions, and yield of a chemical process are changed under different conditions	D1 explain how the rate of a reaction is changed in terms of particle collisions and activation energy

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
1 Collision theory	The tutor could introduce the idea of reactions and collision theory using the animation 'Collision theory' http://www.kscience.co.uk/animations/collision.htm. Using this animation as a reminder the learners could identify the factors that affect rate of reaction (concentration, temperature, surface area, catalyst, pressure). In groups learners could become real life models and demonstrate how they think particles behave in each condition - this will enable the tutor to assess the learners prior knowledge. The tutor should ensure learners understand how particles move, with a re-cap of the animation. Learners could then produce a set of diagrams to show how the particles move/behave and write descriptions as to how the speed/rate of the reaction is likely to be affected.	1 hour	P3 describe the different factors that affect the rate and yield of a chemical process, and explain why the reaction conditions are selected.
2 Collision theory and production of chemicals	Learners could watch the animation 'Collision theory and rates of reaction' http://www.bbc.co.uk/learningzone/clips/collision-theory-and-rates-of-reaction/10668.html. Using the ideas of collision theory learners could explain why the reactions need specific conditions in order to produce the correct quantity of product. The Haber process could be used as an example http://www.bbc.co.uk/schools/gcsebitesize/science/add_aqa_pre_2011/chemreac/energychangesrev3.shtml.	30 mins	P3 describe the different factors that affect the rate and yield of a chemical process, and explain why the reaction conditions are selected.

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
3 Factors that govern rates of reaction	The factors that govern rates of reaction can be explored through a series of practical activities eg: - Acid/thiosulfate to investigate concentration - the practical 'Investigating the effect of concentration on the rate of a chemical reaction' http://www.nationalstemcentre.org.uk/dl/a001b9b9f8d9e7da06af6379eb694f63a49eedcd/28747-Microscale23.pdf could be used. - Temperature - the practical 'Rate of reaction – the effects of concentration and temperature' http://www.rsc.org/learn-chemistry/resource/res00000413/rate-of-reaction-the-effects-of-concentration-and-temperature?cmpid=CMP00000483 could be used. - Surface area - the practical 'Investigating the Rate of Reaction Between Marble Chips (Calcium Carbonate) and Hydrochloric Acid' http://www.studymode.com/essays/Investigating-The-Rate-Of-Reaction-Between-1115998.html could be used. Results could be collected by learners and then presented in graphs, analysed and linked to collision theory. Learners could also watch the short video clip 'Burning milk powder' http://www.rsc.org/learnchemistry/resource/res00000830/burning-milk-powder?cmpid=CMP00000936. - Catalyst - the tutor could demonstrate the 'Iodine clock' reaction http://www.nuffieldfoundation.org/practical-chemistry/iodine-clock-reaction. This could provide the basis for discussion as to why catalysts are used and what conditions are required in order for them to produce a high yield. Alternatively learners could carry out the practical 'Catalysts for the decomposition of hydrogen peroxide' (http://www.rsc.org/images/catalysts_tcm18-188821.pdf). The video 'Sulfuric acid and the Contact process' could be used to introduce this http://www.youtube.com/watch?v=_zj3bMjFclA. - Pressure - the effect of pressure on reactions could be introduced using the short video clip 'The Barking Dog Experiment' http://www.thenakedscientists.com/HTML/content/kitchenscience/garage-science/exp/the-barking-dog-experiment/. Learners could produce a brainstorm/diagram of how they think the gases behave under different pressures. The tutor could then demonstrate the practical task methane rockets http://www.rsc.org/images/methanerocket_tcm18-188848.pdf. This demonstration simply involves changing the percentages of each gas in order to change the distance the rocket to travels. Learners could collect results and discuss 'real life' or 'industrial' situations where understanding the effects of pressure would be important. The learner could produce an experimental write up for one of their investigations that includes method, results, analysis, conclusion and evaluation. An agreed process could then be selected for the production of a report that gives the potential to look at all of the factors that affect rate e.g. Haber process, contact process.	Various	P3 describe the different factors that affect the rate and yield of a chemical process, and explain why the reaction conditions are selected. M2 explain how the rate, in terms of particle collisions, and yield of a chemical process are changed under different conditions. D1 explain how the rate of a reaction is changed in terms of particle collisions and activation energy.

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
4 Activation energy 	The tutor could recap the term 'Activation Energy' and use energy level diagrams to aid in the explanation http://www.gcsescience.com/rc24-energy-level-diagram.htm. Learners could then use ideas of concentration, surface area, temperature and catalysts to describe how the activation energy varies. Learners could then produce a short report summarising the conditions required, when all factors affect the rate of a reaction. Learners could then carry out a practical titled 'The decomposition of magnesium silicide' http://www.rsc.org/learn-chemistry/resource/res00000456/the-decomposition-of-magnesium-silicide.	1 hour	D1 explain how the rate of a reaction is changed in terms of particle collisions and activation energy.

LEARNING OUTCOME 3 – KNOW HOW WASTE TREATMENT METHODS CAN BE USED TO MINIMISE THE ENVIRONMENTAL IMPACT OF A CHEMICAL PROCESS

Learning Outcome The learner will:	Assessment Criteria The learner can:	Merit	Distinction
3 Know how waste treatment methods can be used to minimise the environmental impact of a chemical process	P4 describe how to minimise the waste materials that are produced by a specified chemical process		D2 describe the science behind waste treatment procedures

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
1 Minimising the environmental impact of a chemical process.	A site visit or video resources would help to give context to this section. Learners could research national statistics of the financial benefits of the chemical industry. Company websites often contain information on how links with local communities are developed and maintained. The impact control section could be approached by returning to some of the processes previously studied to look at possible emissions problems and the researching how they are solved. Learners could be given a set of emission problems to solve and they would have to come up with a number of practical solutions.	1-2 hours	P4 describe how to minimise the waste materials that are produced by a specified chemical process. D2 describe the science behind waste treatment procedures.
2 Environmental impact 	Learners could be shown the short video clip on the Le Blanc Process - production of Alkali's http://www.youtube.com/watch?v=6XJ1ywiuj6U. Learners could then use this information to form the basis of a discussion, focussing on the following key topics - waste products and their impact, by-products and their uses, the science behind the waste treatment procedures, impact of the waste products on workers, the industry and local residents. Learners could work in small groups, collating their final thoughts and ideas into a balanced argument.	1 1/2 hours	P4 describe how to minimise the waste materials that are produced by a specified chemical process. D2 describe the science behind waste treatment procedures.
3 Electrolysis of brine	The tutor could describe how electolysis is used to separate chemicals. Learners could carry out the practical 'The electrolysis of solutions' http://www.rsc.org/learn-chemistry/resource/res00000466/the-electrolysis-of-solutions?cmpid=CMP00000536. Learners to could make notes on the products that have been formed and what these may be used for. Learners could also research the potential hazards and pollutants created by electrolysis in industry. Learners could use this activity to challenge their ideas of electrolysis. Extension task - The tutor could use a task from the resource 'Green chlorine' PDF http://www.ciec.org.uk/2%20Topic%20Bank/texts/GreenChlorine.pdf.	1 hour	P4 describe how to minimise the waste materials that are produced by a specified chemical process.
4 Recycling	The tutor could choose a task from 'Recycling cities' http://www.ciec.org.uk/2%20Topic%20Bank/texts/RecyclingCities.pdf. Learners could carry out practical tasks into the production and management of waste for polymers. Learners could write reports on their findings, completing appropriate tasks detailed in the booklet.	1 hour	P4 describe how to minimise the waste materials that are produced by a specified chemical process.

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
5 Waste products 	The learners could discuss the Haber and Contact processes. Learners could identify what type of waste products are created - Haber video - http://www.youtube.com/watch?v=CZDaJ7do6Go and Contact process video - http://www.youtube.com/watch?v=r7XdRMNXVgM - learners could then discuss in small groups and come up with methods of reducing the waste products. Leaners could then produce an action plan for a company stating the techniques and methods they could/should use to reduce waste products. As an extension learners could consider the cost and environmental damage caused if these waste management procedures were not followed.	1 1/2 hours	P4 describe how to minimise the waste materials that are produced by a specified chemical process. D2 describe the science behind waste treatment procedures.
6 Hazard symbols	A visit to a haulage company (that deals with chemicals) or to the fire service would be a possible starter for this section. Learners could research hazard symbols, using CLEAPSS hazards or the internet, and match them to common household chemicals or research the symbols found on household chemicals. Learners could discuss the hazards of some familiar chemicals and the precautions that need to be taken when handling them. This could then be linked to properties of the chemicals.	30 minutes	P5
7 How the chemical industry maintains a good safety record in the manufacture and transport of chemicals.	Learners could return to a previously studied process and consider what safety equipment would be needed by the operatives who are involved in the production of a chemical. Learners could use online catalogues of Health and Safety equipment to estimate the annual equipment budget, a spread sheet could be constructed to allow predictions to be made about future costs. The hazchem code for chemical transport can be researched and the meaning of each section and code can be collected.	45 minutes	M3

LEARNING OUTCOME 4 – KNOW HOW THE CHEMICAL INDUSTRY MAINTAINS A GOOD SAFETY RECORD IN THE MANUFACTURE AND TRANSPORT OF CHEMICALS

Learning Outcome The learner will:	Assessment Criteria The learner can:	Merit	Distinction
4 Know how the chemical industry maintains a good safety record in the manufacture and transport of chemicals	P5 outline how the chemical industry maintains a good safety record in the manufacture of chemicals	M3 explain the precautions taken in the manufacture of chemicals to maintain a good safety record, and link these to the chemical properties of a chosen chemical	
	P6 outline the precautions needed for the transportation of a chosen chemical	M4 explain why specific actions are taken in the transportation of a chosen chemical, and link these to the chemical properties of a chosen chemical	

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
1 Assessing risks in the laboratory 	The tutor could demonstrate the 'Ammonia fountain', an engaging but very hazardous experiment http://www.nuffieldfoundation.org/practical-chemistry/ammonia-fountain. Learners will need to make a full equipment list and use the CLEAPPs hazcards http://www.cleapss.org.uk/secondary/secondary-science/hazcards?start=150 to determine the correct handling of the chemicals involved. In addition, to this learners could identify the appropriate hazard labels that would need to be displayed on the chemicals. A risk assessment could be produced for the task and a Hazard symbol poster to display in the laboratory.	1 1/2 hours	P5 outline how the chemical industry maintains a good safety record in the manufacture of chemicals. M3 explain the precautions taken in the manufacture of chemicals to maintain a good safety record, and link these to the chemical properties of a chosen chemical.
2 Safety clothing 	Learners could be shown a video clip of a chemical plant and discuss the potential hazards and risks on a large scale. Teacher could then provide some chemical scenarios eg working in a chemical plant, working in a pharmaceutical company. Learners could then research and find relevant information about the appropriate safety clothing. Learners could present work in a leaflet/webpage/PowerPoint presentation etc. displaying the scenario and the possible clothing that could be worn and why is necessary. (Example clothing -http://www2.dupont.com/Personal_Protection/en_GB/assets/PDF/LIT_EN_DPP_Catalogue.pdf)	1 hour	P5 outline how the chemical industry maintains a good safety record in the manufacture of chemicals. M3 explain the precautions taken in the manufacture of chemicals to maintain a good safety record, and link these to the chemical properties of a chosen chemical.

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
3 Spillages and disposal 	Learners could be shown a video clip of a chemical spill http://www.youtube.com/watch?v=Dtp9vT15qls. Learners could make notes on what methods were used to clear away the spillages. Learners could use the basic information from the video to carry out some additional research into industrial chemistry spillage and disposal. Learners could present their findings as a safety report, detailing types of chemical spillages, how they should all be handled and how waste should be disposed of. This report should be suitable for a lab technician to use when training new staff.	1 1/2 hours	P6 outline the precautions needed for the transportation of a chosen chemical. M4 explain why specific actions are taken in the transportation of a chosen chemical, and link these to the chemical properties of a chosen chemical.
2 Transporting chemicals 	The tutor could show the learners the Hazchem labels and ask them to consider how they would label trucks that contain; sulfuric acid, ammonia, methane gas, crude oil and any other hazardous chemicals. Learners could carry out research and collect appropriate information about a companies policy on the safe transportation and disposal of chemicals. They should use the information they find to write a policy that would/could be used by a small chemical business that manufactures chemicals (these could include ammonia, sulfuric acid, pharmaceuticals, dyes or fuels).	1 hour	P6 outline the precautions needed for the transportation of a chosen chemical. M4 explain why specific actions are taken in the transportation of a chosen chemical, and link these to the chemical properties of a chosen chemical.

CONTACT US

Staff at the OCR Customer Contact Centre are available to take your call between 8am and 5.30pm, Monday to Friday.

We're always happy to answer questions and give advice.

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