

SEMLATA2-06 - H00J 04

Prepare compounds and solutions for scientific or technical use



Overview

This unit covers the competences you need to measure, weigh and prepare compounds and solutions for scientific or technical use, in accordance with approved procedures and practices. You will be expected to select and use relevant knowledge, ideas, skills and procedures to complete well-defined tasks and address straightforward problems. You will be expected to complete tasks and procedures and exercise autonomy and judgement subject to overall direction or guidance. You will be required to work to the relevant workplace procedures, legislation and organisational policy, and to use good scientific or technical techniques and practices.

On completion of workplace activities, you will be required to show you have completed well-defined, generally routine tasks and address straightforward problems, selecting and using the relevant scientific or technical skills and procedures. You will be expected to show you have identified, gathered and used relevant information to inform your actions and identify how effective these have been.

Your responsibilities will require you to comply with organisational policy and procedures for the scientific or technical activities undertaken, and to report any problems with the activities, materials or equipment that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will work under a team leader, whilst taking responsibility for your own actions in the completion of tasks and procedures, whilst exercising a degree of autonomy and judgement. You will also be responsible for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of scientific or technical facts, procedures and ideas to complete well-defined tasks and address straightforward problems in the workplace. You will have an understanding of the workplace process used, and its application, and will know about the scientific or technical equipment, materials and consumables in adequate depth to provide a sound background for carrying out the activities to the required specification. You will know how to interpret workplace information and ideas and be aware of the types of resources that are relevant to these scientific or technical activities.

You will understand the safety precautions required when carrying out the scientific or technical activities. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

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Performance criteria

You must be able to:

- P1 ensure that your work is carried out in accordance with workplace procedures
- P2 use safe practices and the appropriate personal protection equipment (PPE) when doing scientific or technical activities
- P3 use balances for accurately weighing out materials
- P4 Measure out required concentrations of liquids for scientific or technical use
- P5 measure specific volumes of liquids and weights of solids for scientific or technical use
- P6 communicate the required information about the work done, in accordance with departmental and organisational procedures

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Knowledge and understanding

You need to know and understand:

Sector specific

- K1 the health and safety requirements of the area in which you are carrying out the scientific or technical activities
- K2 the implications of not taking account of legislation, regulations, standards and guidelines when conducting scientific or technical activities
- K3 the scientific or technical techniques and processes you must use correctly in the workplace.

You need to know and understand:

Organisation specific

- K4 the importance of wearing protective clothing, gloves and eye protection for scientific or technical activities
- K5 the importance of correct identification, and any unique workplace coding system
- K6 the lines of communication and responsibilities in your department, and their links with the rest of the organisation
- K7 the limits of your own authority and to whom you should report if you have problems that you cannot resolve

You need to know and understand:

Equipment/Process specific

- K8 how to calculate mass/mole calculations
- K9 how to convert between metric and imperial measures and vice versa
- K10 how to select the appropriate balance and scale for less than 100mg, 100mg to 5g, and 5g and above
- K11 how to check that your equipment is clean, dry, free of chips and ready for use
- K12 how to measure and weigh solids and liquids for scientific or technical use
- K13 how to convert between different units of concentration (such as moles/litre, grams/litre, percent mass per volume and parts per million)
- K14 how to calculate dilution factors and dilution volumes to make solutions from concentrated stock solutions
- K15 how to choose the appropriate measuring equipment for the scale, accuracy and precision required for the task
- K16 how to clean and maintain weighing and measuring equipment (such as pipettes, balances)

Additional Information

Scope/range related to performance criteria

You must be able to:

1. use two of the following types of protective clothing and equipment:
 - 1.1 laboratory coat/apron/overall
 - 1.2 gloves
 - 1.3 full face visor or shield
 - 1.4 dust mask/respirator
 - 1.5 safety glasses or goggles
 - 1.6 fume cupboard
2. carry out weighing activities using balances (scales), using **two** of the following accuracies:
 - 2.1 grams
 - 2.2 milligrams
 - 2.3 micrograms
3. measure out solutions, using **two** of the following:
 - 3.1 automated pipettes
 - 3.2 burettes
 - 3.3 graduated/bulb pipettes
 - 3.4 volumetric flasks
 - 3.5 syringes
 - 3.6 other (please specify)
 - 3.7 graduated cylinders/beakers/tubes
4. calculate the concentrations of solutions, the amounts and volumes required, using **two** of the following:
 - 4.1 moles per litre
 - 4.2 parts per million
 - 4.3 other (please specify)
 - 4.4 grams per litre
 - 4.5 mass percent
5. make up known volumes of solutions to a specified concentration, using **both** of the following:
 - 5.1 by measuring and dissolving the correct amount of solid in the correct volume of diluent/solvent
 - 5.2 by dilution from a concentrated stock solution
6. weigh and prepare **three** of the following types of compound or solution:
 - 6.1 solids that do not readily lose or gain weight (moisture or solvent)
 - 6.2 solids that readily lose or gain weight (moisture or solvent)
 - 6.3 solutions (by dilution from a known concentration)
 - 6.4 solutions (at actual molecular weight)
7. record details of the work, and communicate the details to the appropriate people, using:
 - 7.1 verbal reportplus **one** method from the following:
 - 7.2 written or typed report (eg, laboratory notebook)
 - 7.3 computer-based record
 - 7.4 specific workplace documentation

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7.5 electronic mail

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