# Project Assessment 1

**Assessment event 2 of 3**

## Criteria

### Unit code, name and release number

MSL913004 - Plan and conduct laboratory/field work (1)

### Qualification/Course code, name and release number

MSL30118 – Certificate III in Laboratory Skills (1)

## Student details

### Student number

### Student name

## Assessment Declaration

* This assessment is my original work and no part of it has been copied from any other source except where due acknowledgement is made.
* No part of this assessment has been written for me by any other person except where such collaboration has been authorised by the assessor concerned.
* I understand that plagiarism is the presentation of the work, idea or creation of another person as though it is my own. Plagiarism occurs when the origin of the material used is not appropriately cited. No part of this assessment is plagiarised.

### Student signature and Date

Version: 1.0

Date created: 1/11/2019

Date modified: 07/02/2020

For queries, please contact:

Innovative Manufacturing, Robotics and Science SkillsPoint

Hamilton Campus

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RTO Provider Number 90003 | CRICOS Provider Code: 00591E

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## Assessment instructions

Table 1 Assessment instructions

| Assessment details | Instructions |
| --- | --- |
| **Assessment overview** | The objective of this assessment is to assess your knowledge and performance as would be required to:   * Plan and organise daily work activities * Complete allocated work * Identify and resolve work problems * Work in a team environment * Update knowledge and skills as required |
| **Assessment Event number** | 2 of 3 |
| **Instructions for this assessment** | This is a project based assessment and will be assessing you on your knowledge and performance of the unit.  This assessment is in 3 parts and includes an Assessment Feedback form:   1. Assignment 2. Laboratory Plan 3. Assessment Checklist |
| **Submission instructions** | On completion of this assessment, you are required to upload it or hand it to your assessor for marking.  Ensure you have written your name at the bottom of each page of this assessment.  It is important that you keep a copy of all electronic and hardcopy assessments submitted to TAFE and complete the assessment declaration when submitting the assessment. |
| **What do I need to do to achieve a satisfactory result?** | To achieve a satisfactory result for this assessment all questions must be answered correctly. |
| **What do I need to provide?** | Pens and pencils |
| **What the assessor will provide?** | Assessment Task |
| **Due date and time allowed** | Due 3 weeks prior to the first of the three scheduled laboratory sessions. Time permitted is from issue to due date. |
| **Assessment feedback, review or appeals** | In accordance with the TAFE NSW policy *Manage Assessment Appeals,* all students have the right to appeal an assessment decision in relation to how the assessment was conducted and the outcome of the assessment. Appeals must be lodged within **14 working days** of the formal notification of the result of the assessment.  If you would like to request a review of your results or if you have any concerns about your results, contact your Teacher or Head Teacher. If they are unavailable, contact the Student Administration Officer.  Contact your Head Teacher for the assessment appeals procedures at your college/campus. |

## Specific task instructions

The instructions and the criteria in the tasks and activities below will be used by the assessor to determine if you have satisfactorily completed this assessment event. Use these instructions as a guide to ensure you demonstrate the required knowledge.

**Part 1** Assignment is to be completed individually and submitted with the remainder of your Project by the due date.

**Part 2** Laboratory Planning: You will work to complete the planning for each of the tasks identified in the following brief either individually (Tasks A and B) and as part of a team (Task C). Your assessor will place you in a team with another person when this Assessment is distributed.

You should read the brief to ensure you have a clear understanding of what is required. If you are uncertain, speak with your Trainer. Do not leave it too long as the task does require considerable planning and you will be required to ‘plan’ with your team.

You will be handed back this Assessment at the beginning of each practical Assessment session. You are required to hand in all paperwork at the end of each practical Assessment session.

## Part 1: Assignment

You are to provide a response to each of the questions identified below. Your responses should be no more than 200 words for any question or part of a question. You should read all of the questions before commencing your responses.

1. How would you determine the tasks to be undertaken by you in the laboratory/field over a given day, week and month?
2. Complete the following table by identifying four laboratory/field activities you complete routinely. For each activity identify how you clarify the tasks and the resources that would be required to complete the task.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test | Clarification | Resources |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |

1. If you are requested to complete all the tasks you identified above on the same day:
2. how would you prioritise the work to ensure you completed as requested and
3. what would the order be?
4. If you are unable to complete a laboratory/field task in the required time, what steps are you required to follow?
5. Describe a strategy you use in the laboratory/field to identify problems and/or difficulties that may arise while performing tasks.
6. Prepare a flow chart of a laboratory/field procedure you have completed. Identify the steps where problems are most likely to occur. For each step identified, indicate what could be done if the problems do occur.
7. Laboratory or field work will incorporate tasks that will be carried out by:
8. Individuals
9. Laboratory teams
10. Teams involving personnel from other areas (for example WHS, quality or environment)

In the table below, indicate whether the following would **most** likely to be completed by the individual, a laboratory team or other team (identify the team).

|  |  |
| --- | --- |
| Task | Completed by |
| Investigation into electrical incident in the laboratory |  |
| Preparation of 10% NaOH stock solution |  |
| Collection of 145 field samples from local water treatment plants |  |
| Safety audit of the laboratory |  |
| Return glassware from the drying cabinets to storage in the laboratory |  |
| Quality audit of the laboratory |  |
| Rewriting a Standard Operating Procedure |  |

1. Identify two tasks or procedures you undertake where you are part of a team. For each task or procedure identify your strengths and weakness and also the opportunities that exist for you to undertake skill development in that area.

| Task | Performance evaluation  (strengths and weaknesses) | Skill development |
| --- | --- | --- |
| 1. |  |  |
| 2. |  |  |

## Part 2: Laboratory Plan

To complete this part of the assessment, you will be required to read the brief below. This completed assessment will be used in your next Project Assessment 2.

**Brief:**

This part of the Assessment is the planning for the Laboratory Tasks provided in the information that follows. You and your team are required to complete the following sections that are contained within this document:

1. Plan and organise daily work, for Task A and Task B individually and for Task C with your partner
2. Work in a Team environment in the laboratory for Task C
3. Knowledge and skill development completed individually

You are to plan individually, and as part of a team, for the completion of three Tasks over three 2-hour laboratory sessions. The individual and the team tasks are outlined below. Each member of the team must make a contribution to the team task to be deemed competent.

There are procedures provided in the Appendices.

**Task A** (to be completed individually) Determination of the % composition of a sample of sand, salt and sawdust.

**Task B** (individual) monitor and record the temperature of the laboratory water bath (every 45 minutes from the beginning of each session) and complete the control chart provided.

**Task C** (team based) Urgent analysis of four samples for % sugar by refractometer along with quality control check samples of 7.5% and 12.5%. The results must be ready within 45 minutes of arrival at the laboratory during each session. When the samples arrive the team will need to adjust their individual tasks to accommodate completion of the analysis within the required time (45 minutes).

Task A will be commenced in session 1 and may be completed over the following 2 sessions.

Tasks B and C will both be completed in each of sessions 1 and 2, the third session will be available if there was an issue with the completion of Tasks B and C during sessions 1 or 2.

**Task A Determine % composition of a sample of sand, salt and sawdust**

The sample you are given (~50g) will require mixing and sub-sampling down for triplicate analysis of three 5g samples. You should refer to the procedures provided in the Appendices and choose the most appropriate for the completion of Task A.

**Task B Monitoring, recording and completion of control chart**

The task is to monitor the temperature of the laboratory water bath (every 45 minutes, with at least 2 measurements being made in each of two sessions), report the value on the record sheet and also note on the water bath control chart. You should refer to the procedures provided in the Appendices for the most appropriate for the completion of Task B.

**Task C Urgent analysis % sugar**

The sugar solutions are urgent and will be delivered to you in the first two sessions allocated for the task. If there are particular issues the samples will arrive in the third session also. With your team you will have 45 minutes from the time the samples arrive to complete and report the % sugar. For this task the team will also be required to prepare 50 mL each of the three standard sugar solutions (5, 10, 15 % sugar) in each session. The team should refer to the procedures provided in the Appendices and choose the most appropriate for the completion of Task C.

**1. Plan and organise daily work**

a. Refer to the Appendices in this Assessment and note the procedures you will follow to complete each task.

|  |  |
| --- | --- |
| Task | Procedure(s) |
| 1. Determine % composition of a sample of sand, salt and sawdust |  |
| 1. Monitoring, recording of temperature and completion of control chart |  |
| 1. Urgent analysis % sugar |  |

b. Provide a flowchart of your anticipated combined procedure to show how you plan on completing all 3 Tasks in the time available in each session (i.e. after you have considered each of the procedures provided). Highlight on your flow chart the parts that are team based. There is a blank page following to allow adequate space for your flowchart.

c. Identify the resources/equipment required to complete all three tasks.

|  |  |  |
| --- | --- | --- |
| Task A | Task B | Task C |
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d. List your priority order to ensure all allocated work is completed in the three 2-hour sessions (i.e. assuming nothing goes wrong!).

e. Identify where the tasks could be broken down into smaller components to provide additional efficiency and maintain workflow.

**2. Work in a team environment**

Explain how the team determined the work to be undertaken by each member in each of the sessions, considering the following:

1. Recognition of personal abilities and limitations.
2. How roles would be confirmed during the actual laboratory session.
3. The responsibility of each team member, including yourself, to report the results in the time frame.
4. The importance of considering sensitivity of other team member’s backgrounds and beliefs.
5. How will the team review the workplan when an urgent sample arrives?
6. What alternatives were considered by the team for the allocation of work? (Provide at least one)
7. What problem solving strategies has the team decided to use, to consider possible causes and solutions to any problem that arises? (Provide at least one)

**3. Knowledge and skill development**

1. During the individual and team planning you have undertaken for this Assessment, reflect on your own involvement and identify your strengths and weaknesses.
2. List skill development opportunities (at least three) you have undertaken in the laboratory that have provided you with additional knowledge of the laboratory area (this could be as individual skills and associated knowledge).

## Appendices

Appendix 1

**Sample reduction: Cone and quartering laboratory sample to analytical sample**

# **INTRODUCTION**

A sample is a representative portion of a large mass of material. The method of reducing a large mass into a smaller, easier to manage portion should not cause any change to the physical and chemical characteristics of the original material.

# **PURPOSE**

The procedure is for the reduction down to the analytical sample size required by a particular method from a laboratory sample of no more than 250 g.

**Note:**

1. If the sample size is larger than 500 g it will require sub-sampling initially by another technique such as a riffle box.
2. The sample should not contain toxic material that would require wearing of additional PPE such as mask.

# **SCOPE**

This standard operating procedure applies to all bulk materials received by the laboratory and the sub-sampling down to the required sample mass.

# **RESPONSIBILITIES**

The Laboratory Manager or their delegate has overall responsibility for this standard operating procedure. They are to review any problems experienced (non-conforming product/service) and take appropriate action. The problem and any actions taken are then to be recorded.

Laboratory staff, if appropriately trained, may undertake responsibility for all tasks in this standard operating procedure.

# **RELATED DOCUMENTS**

This procedure should be read in conjunction with the following related documents:

* Laboratory Manual
* Quality Control Manual
* WHS Manual

1. **WHS**
   1. **Clothing**

Wear the following PPE when conducting this standard operating procedure:

* Closed footwear
* Laboratory coat
* Safety glasses
* Gloves – nitrile
  1. **Housekeeping**

Wash hands and ensure the workstation is clean and tidy before commencing this standard operating procedure. When the task is complete, wash hands, clean the workstation and dispose of any waste materials according to workplace procedures.

# **PROCEDURE**

* 1. **Materials, reagents and equipment**
     1. Materials
* Sample as received by the laboratory
  + 1. Equipment
* Plastic sheet (approximately 45 cm x 45 cm)
* Large spatula
* Plastic weighboats
  1. **Method**
     1. Determine the approximate mass required of the analytical sample (note how many samples are required)
     2. Place the plastic sheet on the laboratory bench
     3. Record the information on the sample container and check against any chain of custody paperwork accompanying the sample
     4. Tip the sample onto the plastic sheet
     5. Ensure the sample is well mixed by carefully repositioning the bulk using small scoops to form a cone on a different section of the plastic
     6. Repeat 7.2.5 until the sample appears homogeneous
     7. Gently flatten the cone and divide into four using the spatula
     8. Two opposite quarters are removed from the sample and a new cone is prepared from the sample remaining
     9. Steps 7.2.6 – 7.2.8 are repeated until the final sample is of mass required
     10. The remaining sample is then repacked into a labelled container as the laboratory sample from which the analytical sample could be taken
     11. Dispose of the left-over sample according to laboratory procedures and clean down the work area

Appendix 2

**Determine % composition of sample of sand, salt and sawdust**

This separation uses the physical properties of solubility, density and basic laboratory equipment to complete the task. If the sample requires sub-sampling you will need to follow a procedure for sample reduction such as in 4 below. This procedure commences with a Laboratory Sample of approximately 50 g and uses a combination of simple techniques to reach the reported values. It should be note that there are a number of different combinations that could be considered and this may have been the focus of a previous class activity.

The analysis is conducted in triplicate.

**Procedure:**

(It is important to read the entire practical prior to commencement to limit blockages to work flow)

1. Using clean and dry weigh boats and an analytical balance, weigh out, in triplicate approximately 5 g of the sample (record the mass taken)
2. Quantitatively transfer the samples into small beakers, using purified water (you should aim for no more than 50 mL in the beaker)
3. Swirl and then allow the mixture to stand while you prepare step 5
4. Label and weigh three medium sized evaporating basins
5. Prepare a simple filtration apparatus for each mixture, using a weighed evaporating basin, filter funnel and filter paper
6. Quantitatively filter each solution through the filter paper into the evaporating basin
7. The evaporating basin now contains a salt solution and there should be no salt in the filter paper
8.  You need both the solution in the evaporating basin and also the material in the filter funnel. Do not throw anything out!
9. Place the evaporating basins over a steam bath taking care not to contact the steam
10. Place the filter papers back into the small beakers and place into a drying oven until dry (the next session maybe)
11. Remove the beakers with the filter papers, from the drying oven and allow to cool
12. While the beakers are cooling, weigh and record the mass of six labelled filter papers (ensure you do not use PS papers as the solution will not pass through)

*The next section of this practical relies on separating the sand and salt by density, but it is important that you do not delay during the process. If the dry mixture is swirled in a beaker of water the sand will generally sink straight to the bottom and the sawdust could be decanted into another beaker. The process will take a few repetitions until you have a separation of the sand and sawdust in different beakers (but also lots of beakers of water). As the salt has been removed the separated components will only require filtration, the water is able to go down the sink.*

1. Carefully brush the sand and sawdust into weigh boat
2. Obtain a 600 mL beaker and half fill with water (tap-water is fine)
3. Obtain a number of additional empty beakers
4. Transfer the sand and sawdust into the beaker with lots of swirling
5. Quickly decant the sawdust into a clean beaker
6. Repeat the process until you have a beaker with only sand and a beaker with only sawdust
7. Decant off as much of the water from each beaker as possible
8. Use the filter papers weighed in step 12 to filter each beaker of sand and sawdust
9. Dry each filter and then reweigh, recording your values on the Laboratory Data and Calculation Sheet
10. Wash and dry all equipment and return to storage
11. Complete the calculations and report the average % sand, salt and sawdust for your sample

Appendix 3

**Measurement of temperature** (taken fromPart 3 Measurement of sample or equipment temperature of *M116 Calibration of thermometer, measuring of temperature of sample/equipment*)

**Part 3: Measurement of temperature of sample or equipment**

3.1.1 Obtain a thermometer that has been calibrated

3.1.2 Place the thermometer so that a stable reading can be obtained (for a liquid sample the immersion mark must be covered by the sample, for a drying oven this will generally mean suspending the thermometer through the top of the oven)

3.1.3 Allow the reading to stabilise

3.1.4 Record the value

3.1.5 Repeat at least once and average the result before reporting

Appendix 4

**Refractive Index:** To determine % sugar

**Standard Preparation**

1. Obtain 3 clean 50 mL volumetric flasks and label 5%, 10% and 15% sugar, team initials and date
2. Prepare 50 mL of each of the three standard sugar solutions by quantitatively transferring 2.5 g, 5 g and 7.5 g sugar into the 3, 50 mL labelled volumetric flasks
3. Make up to the mark with purified water, cap and shake

**Refractive Index**

1. Ensure refractometer prism is clean
2. Use a pasteur pipette to transfer a small volume of the standard solutions onto the refractometer, cleaning between samples with water and propanone
3. Adjust the settings of the refractometer to obtain the true value of refractive index for each of the standards, the 2 quality control samples and the four production samples
4. Record your results into the table on the results sheet
5. Graph your values of refractive index (vertical axis) versus standard sugar concentration
6. Determine the concentrations of the 4 unknown sugar solutions (%) and the two quality control samples
7. Report your results on the paperwork provided
8. Clean up the area

## Part 3: Assessment Checklist

The following checklist will be used by your assessor to mark your performance against the assessment criteria of your submitted work. Use this checklist to understand what skills and/or knowledge you need to demonstrate in your submission/presentation. All the criteria described in the Assessment Checklist must be met. The assessor may ask questions while the submission/presentation is taking place or if appropriate directly after the task/activity has been submitted/completed.

| Part | Instructions | S | U/S | Assessor Comments |
| --- | --- | --- | --- | --- |
| **1** | Student completes the Project answering all questions in the spaces provided. |  |  |  |
| **2** | Laboratory Planning: student responds to all the questions and notes the decisions made by the team for Task C and possible contingencies.  During team discussions, the student needs to:   * Respectfully listen to the views of team members * Contribute own ideas to team discussion * Display an openness to other ideas and suggestions * Work with team members to reach an agreed approach |  |  |  |

## Assessment Feedback

*NOTE: This section* ***must*** *have the assessor signature and student signature to complete the feedback.*

### Assessment outcome

Satisfactory

Unsatisfactory

### Assessor Feedback

Was the assessment event successfully completed?

If no, was the resubmission/re-assessment successfully completed?

Was reasonable adjustment in place for this assessment event?  
*If yes, ensure it is detailed on the assessment document.*

Comments:

### Assessor name, signature and date:

### Student acknowledgement of assessment outcome

Would you like to make any comments about this assessment?

### Student name, signature and date

***NOTE: Make sure you have written your name at the bottom of each page of your submission before attaching the cover sheet and submitting to your assessor for marking.***