# Project Assessment

**Assessment event 2 of 2**

## Criteria

### Unit code, name and release number

MSL922001 - Record and present data (2)

### 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: 30/08/2019

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For queries, please contact:

Innovative Manufacturing, Robotics and Science SkillsPoint

Hamilton Campus

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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:   * record and store data * perform simple calculations of scientific quantities * present information in tables and graphs. |
| **Assessment Event number** | 2 of 2 |
| **Instructions for this assessment** | This is an assignment based assessment and will be assessing you on your knowledge and performance of the unit.  This assessment is in 3 parts:   1. Assignment 2. Assessment Checklist 3. Assessment Feedback |
| **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 calculator, computer with a spreadsheet program is optional |
| **What the assessor will provide?** | Access to a computer with a spreadsheet if the student chooses to use a spreadsheet |
| **Due date and time allowed** | Due date should be set at least six weeks after the date of issue. |
| **Assessment feedback, review or appeals** | Appeals are addressed in accordance with Every Student’s Guide to Assessment. |

## 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

To complete this part of the assessment, you need to answer all the questions. The responses in the tables may be either single words or up to 50 words for longer responses.

**Question 1**

1. Name four (4) pieces of information that should be recorded about a sample that has arrived for testing. Indicate in the table why the information is important.

Table 3 Sample information

|  |  |  |
| --- | --- | --- |
| Number | Sample information recorded | Reason |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |

1. Estimation is an important ‘tool’ for anyone working in a laboratory. Explain how estimation can be useful in identifying incorrect data.
2. The data below contains two sets of data from the same sample. The true value for the average of each sample is 25.0. Determine the relative precision and relative error for each set.

Table 4 Accuracy and precision

|  |  |  |
| --- | --- | --- |
|  | Set A | Set B |
|  | 24.30 | 25.0 |
|  | 24.35 | 24.6 |
|  | 24.2 | 25.5 |
|  | 24.25 | 24.9 |
|  | 24.30 | 25.4 |
|  | 24.25 | 25.4 |
|  | 24.35 | 24.6 |
| Average | 24.29 | 25.06 |
| Range | 0.15 | 0.90 |
| Relative precision % |  |  |
| Relative error % |  |  |

1. Explain the terms accuracy and precision as they relate to laboratory work. Use the above data sets as an example.
2. Describe a typical laboratory procedure for checking result data to ensure the information recorded is correct.
3. Describe the way data entry errors are rectified in a typical laboratory.
4. What is a typical laboratory procedure for dealing with results that are deemed outliers? Provide an example of an outlier you have experienced in the TAFE laboratory. Why is it important that outliers are identified and checked routinely?
5. What is a typical laboratory procedure for storing and filing data?
6. Describe how laboratory data can be protected from tampering, damage, or loss. What systems are used protect data from fire/water damage etc?

**Question 2**

1. Complete the following table listing the **seven (7)** base units of the SI system by physical quantity, name and symbol. The first of these has been added as an example.

Table 5 SI Units

|  |  |  |
| --- | --- | --- |
| SI Base unit (physical quantity) | Name | Symbol |
| Mass | kilogram | kg |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Name and give the symbols for the **six (6)** standard SI prefixes.

Table 6 SI prefixes

| SI prefix | Symbol |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Question 3**

1. Explain why tables, charts and graphs are useful in the workplace as a way of representing data.
2. A patient’s food and energy intake was monitored. It was found that the following nutrients contributed the percentages of total energy intake as shown in the table:

Table 7: Energy contributed by different nutrients

|  |  |
| --- | --- |
| **Nutrient** | **Percentage (%)** |
| Carbohydrate | 50 |
| Protein | 25 |
| Fat | 25 |

Complete the following bar chart by entering bars representing the three nutrients using data from the above table. Then using the same data complete the pie chart next to it by drawing lines and labelling the 3 different categories.

**Figure 1 Percentage of energy intake contributed by different nutrients**

**Figure 2 energy intake contributed by different nutrients**

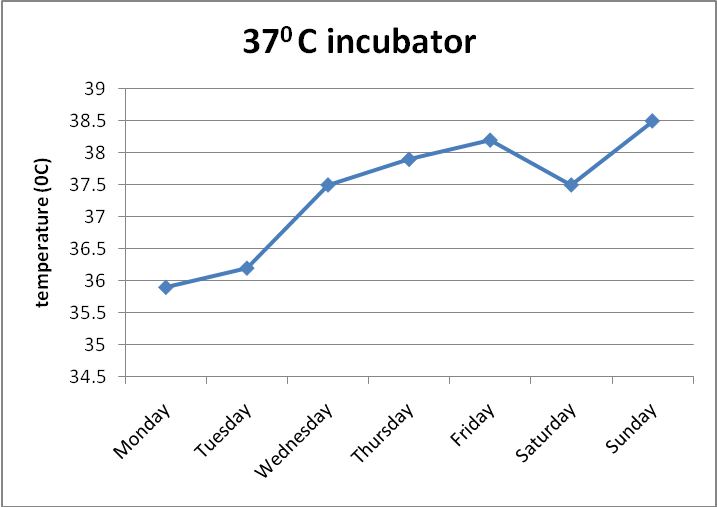
1. Refer to Figure 1 below which shows causes of injury due to drug reaction over the course of a year.

**Figure 3 – Causes of injury due to drug reaction**

Examine Figure 3 to identify the appropriate answers to the following questions

1. Which was the greatest cause of injury?
2. How many injuries were due to an inappropriate drug being given to the patient?
3. Refer to the graph for the temperature changes in the 37°C incubator and answer the following questions.

**Figure 4 – Temperature changes in incubator**



i. On what day was the temperature 37.5°C?

1. What is the trend of the temperature?

**Question 4**

Consider the following data of a set of analysis results (30) for pH determination taken every 30 minutes on a production line.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample | pH | Sample | pH | Sample | pH |
| 1 | 7.4 | 11 | 7.6 | 21 | 9.5 |
| 2 | 7.2 | 12 | 7.5 | 22 | 7.3 |
| 3 | 11.4 | 13 | 7.4 | 23 | 7.1 |
| 4 | 7.2 | 14 | 7.5 | 24 | 7.5 |
| 5 | 7.3 | 15 | 7.6 | 25 | 7.0 |
| 6 | 7.2 | 16 | 7.9 | 26 | 7.0 |
| 7 | 7.3 | 17 | 8.3 | 27 | 7.0 |
| 8 | 6.9 | 18 | 8.8 | 28 | 7.2 |
| 9 | 7.4 | 19 | 9.2 | 29 | 7.1 |
| 10 | 7.3 | 20 | 9.4 | 30 | 7.1 |

1. Calculate the average pH over the time set.
2. Which result could be an outlier? How would you deal with this value in your calculations?
3. What is the range of pH units in the data provided?
4. The tolerance for pH in the process is ± 0.5 pH units from the ideal of 7.3. How many results are outside the tolerance limit?
5. Are there any trends evident in the evidence provided? Explain the trends observed.
6. Is there a better way to present the data to allow easy recognition of possible problems in the process? Explain your response.
7. After which sample should there have been an attempt made to bring the process into specification?
8. After which sample does it appear that there has been a change made to the process? Why did you choose this sample?

**Question 5.**

Calculate the % content of the following food specimens given the following raw data. Show all working out.

* 1. % Moisture in dry cereal (Method: drying to constant mass at 100oC)

Table 8: Moisture Calculation

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mass (g) | Working Out | Answer |
| Mass of container + sample before drying | 36.5520 |  |  |
| Mass of container + sample after drying | 36.5090 |
| Weight of original sample | 2.0110 |

* 1. % Ash of dry cereal (Method: ashing for 6 hrs at 1000oC)

Table 9: Ash calculation

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mass (g) | Working Out | Answer |
| Mass of dry container | 3.6080 |  |  |
| Mass of container + sample before ashing | 5.1080 |
| Mass of container + sample after ashing | 3.6154 |
| Mass of original sample | 1.5000 |

* 1. The food sample was analysed using the Kjeldahl nitrogen method. If the %Nitrogen was determined to be 0.4% what % Protein was in the sample. (The conversion factor for nitrogen to protein is 6.25).

1. A Whisky sample was prepared by pipetting 5.0 mL and making it up to 20 mL in a volumetric flask with Milli-Q water. It was then analysed using a Gas Chromatograph. The analysed sample was found to contain 9.8% ethanol. What is the ethanol content in the undiluted whisky?
2. Sulfite (a preservative) was found at a level of 3.1 mg per 500 g packet of dried apples. What is the % SO2, express your answer in scientific notation if appropriate.
3. Atomic Absorption Spectroscopy (AAS) analysis showed that 5.5 ppm of zinc was present in a sample of town water. Express this in % zinc (Remember to use the correct unit and also scientific notation if appropriate).

**Question 6**

**Analysis of caffeine**

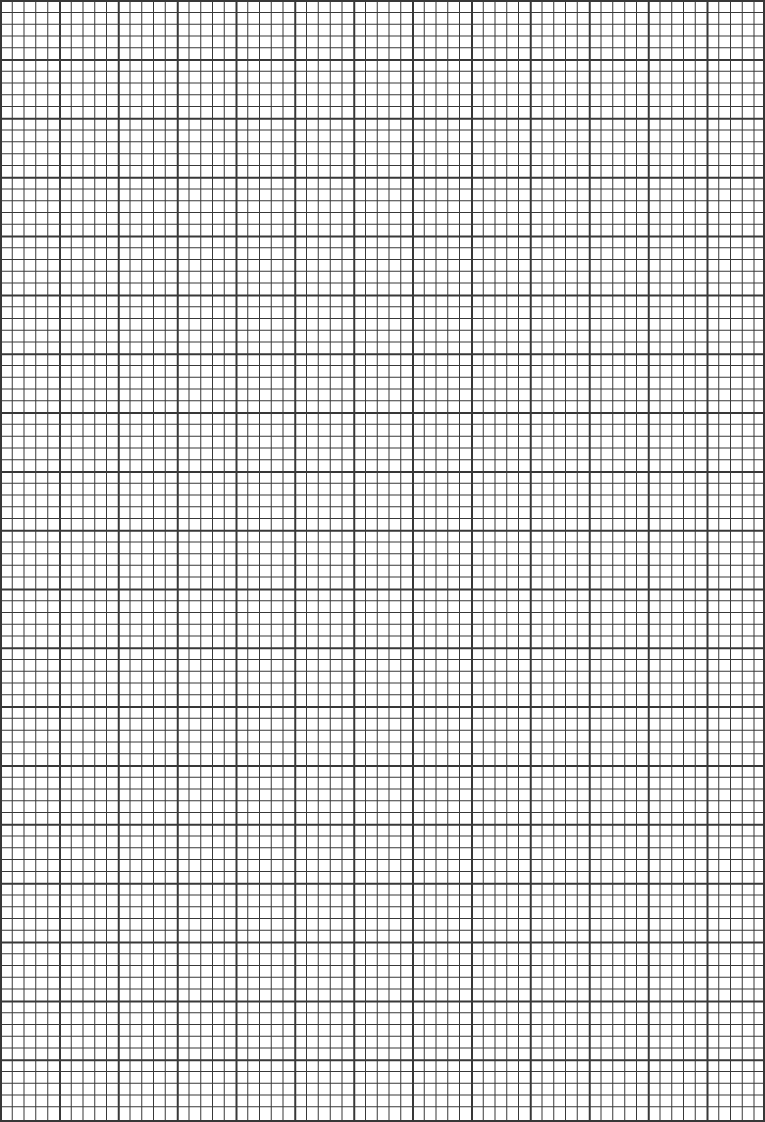
The table below shows how the readings from an instrument change as different concentrations of known standard solutions of caffeine are measured

Table 10: Caffeine standards

|  |  |
| --- | --- |
| **Caffeine Standard mg/L** | **Absorbance** |
| 20 | 0.15 |
| 40 | 0.32 |
| 60 | 0.88 |
| 80 | 0.62 |
| 100 | 0.78 |

1. Identify (highlight or circle) the suspicious data point in the table.
2. Disregarding the suspicious data point plot the remaining caffeine standards on the graph paper provided or use a computer to generate the graph and attach the copy to your assessment.

**Figure 5 Caffeine Calibration**

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1. 5 cups of brewed coffee were analysed on the same instrument as the standards. The samples were prepared by taking 5 mL of the sample (quantitatively) and diluting to 25 mL. The absorbance of each sample is noted below. Determine the mass of caffeine in each cup of coffee (250 mL).

Table 11: Analysis of caffeine by HPLC

|  |  |
| --- | --- |
| **Brewed sample** | **Absorbance** |
| 1 | 0.35 |
| 2 | 0.40 |
| 3 | 0.28 |
| 4 | 0.45 |
| 5 | 0.30 |

**Question 7**

* 1. Calculate the Perimeter and the Area of each of the following shapes.

Rectangle

12cm

7cm

i)

Perimeter:

Area:

16m

Square

ii)

Perimeter:

Area:

iii)

3m

5m

5m

8m

Isosceles Triangle

Perimeter:

Area:

* 1. Calculate the volume of each of the following shapes.

i)

Cube

350mm

Volume:

ii)

200mm

200mm

250mm

Rectangular Prism

Volume:

iii)

30mm (radius)

100mm

Cylinder

iii) If the rectangular prism and the cylinder above were containers, what is the maximum number of these cylinders that could be packed into the rectangular prism? (ignoring wall thickness and without squashing or stretching the containers).

Perimeter:

**Question 8**

1. Present the following results of analyses in a suitably titled table:

*12/6/19 W.Grout D.O.B 23/2/75 Blood Alcohol 0.082%, J. Howard D.O.B. 18/11/87, Blood Alcohol 0.047%, J. Minh D.O.B. 11/4/81 Blood Alcohol 0.063%*

*13/6/19 B. Pitt D.O.B. 12/8/78 Blood Alcohol 0.078% L. Daley D.O.B. 21/4/84 Blood Alcohol 0.046%, B. Stamopoulos D.O.B. 28/2/86 Blood Alcohol 0.048%*

*14/6/19 G. Michael D.O.B. 16/1/83 Blood Alcohol 0.066% O. Laden D.O.B. 5/10/84 Blood Alcohol 0.046%, H. Golightly D.O.B. 15/11/82 Blood Alcohol 0.053%*

1. A workplace requires patient records to be stored by patient’s family name. Sort the following patient record titles shown in the left table alphabetically by family name and enter into the table on the right.

Table 12: Patient records

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Family name** | **First given name** |  | **Family name** | **First given name** |
| Lahood | Cameron |  |  |  |
| Wilson | Ruby |  |  |  |
| Bozkus | Arthur |  |  |  |
| Moussa | Mohammed |  |  |  |
| Nguyen | Bao |  |  |  |
| Campbell | Jordan |  |  |  |
| Hong | Pyo |  |  |  |
| Kumar | Rama |  |  |  |
| Tan | Terry |  |  |  |
| Lewis | Louise |  |  |  |

1. Test results were transcribed from a technician’s notebook to a record sheet. You are required to check the quality of the data.

## Technician: Ralph Notebook

1/6/18 Fermenter 1 - % alcohol 5.7, pH 5.8, Fermenter 2 - % alcohol 1.5, pH 6.8, Fermenter 3 - % alcohol 3.8, pH 5.6, Fermenter 4 - % alcohol 6.9, pH 5.1

2/6/18 Fermenter 1 - % alcohol 6.2, pH 5.4, Fermenter 2 - % alcohol 2.3, pH 6.2, Fermenter 3 -% alcohol 4.1, pH 5.2, Fermenter 4 - % alcohol 7.4, pH 4.7

3/6/18 Fermenter 1 - % alcohol 6.9, pH 4.8, Fermenter 2 - % alcohol 4.1, pH 5.5, Fermenter 3 - % alcohol 5.0, pH 4.7, Fermenter 4 - % alcohol 7.8, pH 4.4

1. Circle 4 transcription errors in the Laboratory Record Sheet below.
2. Correct them to what they should be, marking them in the Laboratory Record Sheet.
3. Sign and date the Laboratory Record Sheet to indicate you checked the data.

Table 13: Laboratory Record Sheet

**Laboratory Record Sheet**

**Wonder Wines Pty Ltd Table 1: Alcohol and pH of Fermenters records**

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Fermenter | Alcohol (%v/v) | pH |
| 1/6/19 | 1 | 5.7 | 5.8 |
| 1/6/19 | 2 | 1.5 | 6.8 |
| 1/6/19 | 3 | 3.8 | 5.6 |
| 1/6/19 | 4 | 6.2 | 5.1 |
| 2/6/19 | 1 | 6.9 | 5.4 |
| 2/6/19 | 2 | 2.3 | 6.2 |
| 2/6/19 | 3 | 4.1 | 6.2 |
| 2/6/19 | 4 | 7.4 | 4.7 |
| 3/6/19 | 1 | 6.9 | 4.8 |
| 3/6/19 | 2 | 4.7 | 5.5 |
| 3/6/19 | 3 | 5.0 | 4.7 |
| 3/6/19 | 4 | 7.8 | 4.4 |

**Signed:** Ralph Reddit\_\_\_\_\_\_

**Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Checked: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Question 9**

Consider each of the following graphs of a production run showing time against a particular reading.

Identify which Process Run indicates the following by placing the letter from the graph in the table below:

|  |  |
| --- | --- |
| 1. Process out of control: s out of |  |
| 1. Process very stable: |  |
| 1. Process with an exponential decrease in reading before stability: |  |
| 1. Process showing steady increase in reading: |  |
| 1. Process showing an exponential increase in reading before stability: |  |
| 1. Process showing steady decrease in reading: |  |

**Question 10**

1. Reference material must be carefully filed and stored in a laboratory, as well as all test Data. Some of the types of reference materials that must be stored are identified in the table below. Identify those that can be readily found in your laboratory, where they are located and who is responsible for maintaining the material.

|  |  |  |  |
| --- | --- | --- | --- |
| Reference material | Location In laboratory | Location | Responsibility |
| NATA technical notes |  |  |  |
| Standards Australia test methods |  |  |  |
| Sampling guidelines |  |  |  |
| Testing guidelines |  |  |  |
| Company QA manual |  |  |  |
| Safety Data sheets |  |  |  |
| WHS guidelines and regulations |  |  |  |
| Equipment operational manuals |  |  |  |
| Calibration logs and reports |  |  |  |
| Workplace test results |  |  |  |
| Chain of custody forms |  |  |  |
| Environmental guidelines |  |  |  |

## Part 2: Assessment Checklist

The following checklist will be used by your assessor to mark your performance against the assessment criteria of your submitted Assessment. 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 #1 | Instructions | S | U/S | Assessor Comments |
| --- | --- | --- | --- | --- |
| **Assignment questions** | Complete the assignment by providing responses to each question in the space provided |  |  | *Date of Observation:* |

## 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.***