**Lab practice 1: Working in the laboratory. Skills and Safety**

**Assessed criterion: AIE**

**Skills developed in this session:**

* Preparation of solutions
* Use of instruments to measure volume, measuring cylinders, pippettes etc.
* Use of volumetric flask

**Task**

## To revise laboratory safety measurements and develop several lab skills.

**Remember!**

In the laboratory, we carry out most of the steps of the scientific method, especially the experimentation.

To work in the laboratory, it is important to follow a set of rules. Not following these rules can result in failure of the experiment, a loss of time – and most important: a health hazard.

**Some of the main rules to follow are these:**

- Make sure you have the necessary **apparatus, instruments** and **material**, that they are clean and in perfect condition.

- **On the working bench**, put only the material you need to carry out the experiment. Do not place the materials close to the edge of the table to avoid accidents.

-During a lab practice you must always, **pay close attention** and **focus on the task**, especially when working with any hazard materials. Your working area should be clean at all times. **Any spillages or accidents should be taken care off immediately!**

- You are to have a laboratory notebook. In the notebook, you should note: the lab practice of the day as well as the date, and any observations and collection of data, as needed.

- When you finish, the working areas **must be** **clean and tidy.**

- If you have worked with any chemicals or hazard materials **wash your hands** before you leave the laboratory!

You will have a Criterion A summative assessment on recognizing different laboratory material and equipment as well as their proper use, just as questions on specific lab skills.

**Skill development 1: Measuring volumes, pipetting and reading a meniscus**

**Use of the pipette**

**Objectives**

* To learn how to use the bell-bulb pipette.
* To practice reading the meniscus.
* To learn about errors in measurements.
* To develop self-management skills such as reflection.

**Materials**

* Measuring pipette and pipette bulbs
* Beaker
* Water

**Procedure (work in pairs)**

* 1. Pay attention to the teacher’s instructions on how to use the pipette and pipette bulb.
  2. Practice taking the following volumes with the pipette: 5mL, 3.5mL, 7.4mL, 1.5mL, 8mL, and 1.8mL. Make sure you use the proper pipette for each measurement. You can place the water from the pipette back in the beaker. PEER FEEDBACK
  3. The teacher will come around asking you to withdraw a particular water volume to see how you do it and correct possible errors or mistakes.

**Questions**

* + 1. Which pipette would you use in order to take 4mL of a liquid?
    2. If you had to measure 8mL of a liquid, would you use a 5mL pipette and use it twice or would you use a 10mL pipette? Do you think it would make any difference? Give a brief explanation referring to errors.
    3. What is the difference between a measuring cylinder and a measuring pipette?
    4. You are measuring different volumes in lab. One of the volumes you need to pipet is 8 mL of water. However, as you are still learning how to use the measuring pipettes, instead you systematically pipet 7.5mL, 0.5 mL less than the needed volume. Are your measurements accurate? Are your measurements precise?

Explain both answers and the difference between accuracy and precision.

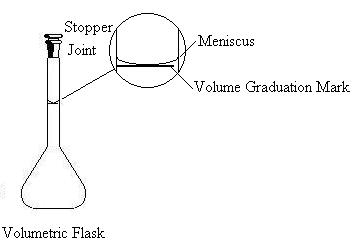
**Skill development 2: Preparing solutions**

**Objectives**

* To practice and become more confident on important laboratory skills such as the use of the electronic scale, pipetting and accurate measurements.
* To learn how to use the volumetric flask.
* To learn how to prepare a solid - liquid solution.
* To develop self-management skills such as reflection.

**How to use a scale.**

1. You have used the electronic scales in previous years. However, you will be using it a lot more during this year. It is therefore very important to revise how to use it properly to minimize errors in your measurements as well as to avoid any damages to the scales.
2. **How to prepare a solution**

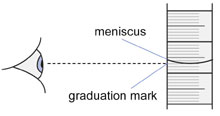
An important piece of equipment called a **volumetric flask** will be used in this experiment. A volumetric flask is used to prepare solution of known concentrations as it gives you a very precise volume (100 ml, 250 ml, etc.), due to its narrow neck, therefore minimizing errors in the prepared concentrations.

**Materials**

* Water
* Glucose
* Electronic scales
* Beaker
* Volumetric flask
* Spatula
* Plastic pipette (dropper)
* Weighing boat (if available)
* Handmade paper funnel (if needed)

**Procedure**

* 1. Use a weighing boat or make a paper tray and place it on the electronic scales. Remember to press the tare button so that you will only weigh the glucose.
  2. Weigh the amount of glucose that the teacher tells you using the spatula.
  3. Add the glucose to the volumetric flask (if needed with the help of a handmade paper funnel).
  4. Add some water to de volumetric flask. Put the stopper on the flask and holding the stopper in the flask with your index finger carefully invert it a few times to mix the solution.
  5. Once the glucose has dissolved, fill the volumetric flask to just below the line with water.
  6. Using the plastic pipette carefully add water until the line.
  7. Check that the lowest part of the meniscus (the curved part of the water) is touching the line. Make sure that your eye level is at the same level as the meniscus as shown in the diagram below.



**Questions**

* + 1. As you prepare your solution, by accident, you add a bit more water going above the line of measurement, what should you do and why?
    2. Reflect of what sort of things you have done incorrectly during the preparation of solutions that you need to improve.
    3. What skills have you done correctly and therefore feel more confident for future practices? (Reflection).
    4. Why do we not use a beaker to prepare solutions?
    5. You are preparing a glucose solution of a given concentration. As you are transferring the glucose into the flask, you spill some of the measured glucose.

1. Should you start from the beginning?
2. Should you take some more glucose and add it to the flask?
3. Should you just ignore it and prepare the solution anyway?

Explain the chosen answer in terms of errors.