**Lab practice 2: Working in the laboratory. Skills and Safety**

**Assessed criterion: AIE**

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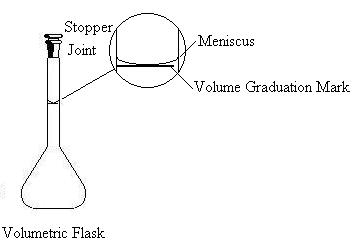
**Preparing solutions**

**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 organization and 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.). Thanks to its narrow neck, you will be able to see the meniscus as you fill in the flask up to the line. This will therefore minimize errors in the prepared concentrations.

**Materials**

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

**Procedure**

* 1. Read the entire procedure before you start.
  2. Draw a detailed picture of the electronic scale you are going to use. Identify and label the following: tare button, the precision of the scale (significant figures), the unit of measurement (does it have other units of measurement that are familiar to you?), and if available its maximum load.
  3. Use a weighing boat or make a paper tray and place it on the electronic scale. Remember to press the tare button so that you will only weigh the salt.
  4. Weigh the amount of salt that the teacher tells you using the spatula.
  5. Add the salt to the volumetric flask (if needed with the help of a handmade paper funnel).
  6. Add some water to de volumetric flask. Put the stopper on the flask and hold the stopper in the flask with your index finger. Carefully invert it a few times to mix the solution.
  7. Once the salt has dissolved, fill the volumetric flask to just below the line with water.
  8. Using the plastic pipette carefully add water up to the line.
  9. Check that the lowest part of the meniscus (the curved part of the water line) is touching the marked line on the flask. Make sure that your eye level is at the same level as the meniscus.

**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 do you think went well and why? (Reflection)
    4. Which specific skill practice do you think you can improve and how? (Reflection)
    5. Why do we not use a beaker to prepare solutions?
    6. What is the systematic error of the scale you have used? Where can you find this information?
    7. You are preparing a salt solution of a given concentration. As you are transferring the salt into the flask, you spill some of the measured salt.

1. Should you start from the beginning?
2. Should you take some more salt 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.