ATLaS: Assistant Toolkit for Laboratory Solutions

USER MANUEL

The main page of ATLaS contains five links in order to reach the calculation required during solution preparation. Five main modules are easily accessible from the home page (Figure 1).
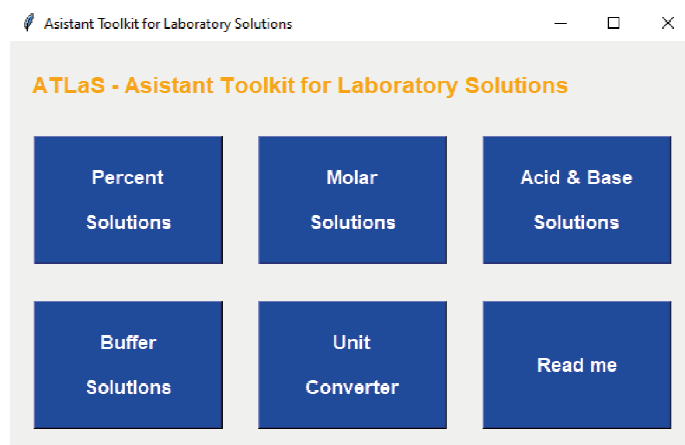

Figure 1. Main page of ATLaS

Figure 2 shows the "Percent Solutions" module. Each function is placed separately. In the first function, when the information is entered in the relevant places and the "Calculate" button is pressed, how the solution will be prepared is given as an output. The calculations required to prepare a 2.5% and 100 ml of solution by using a 10% solution are shown in the second function. In the third function, the molarity of 12% solution of NaOH was calculated. For this, the formula weight of NaOH (40 g / mol) was entered and the result is calculated as 3 M.
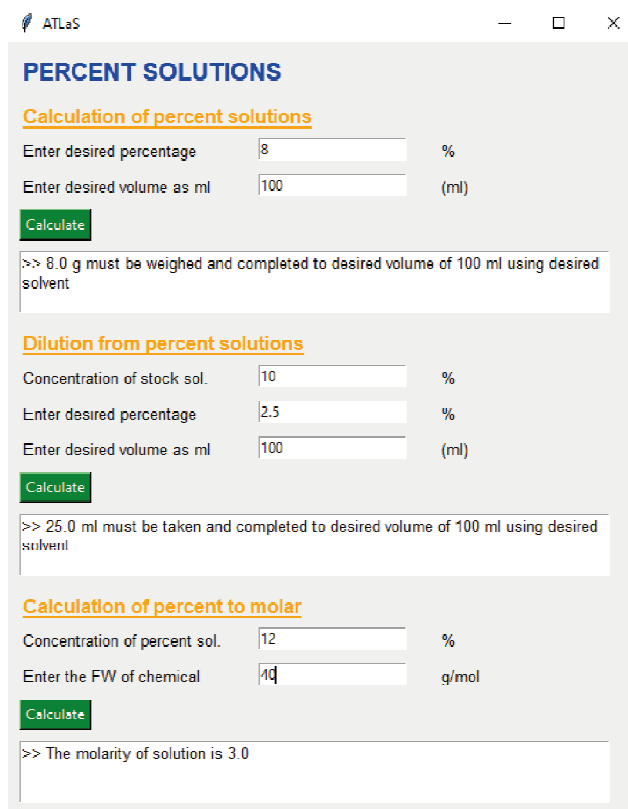

Figure 2. "Percent Solutions" window and demonstration of calculations

The second module makes molar calculations. Examples are given in Figure 3. In the first function of this module, the formula weight of NaOH 40 g / mol, 10 ml as the desired volume and 3 M as the desired molar concentration were entered to prepare the molar solution. In the second function, parameters were entered to prepare a 10 ml of 1 M solution from a 2.5 M stock solution. The results were shown after the "Calculate" button was pressed. In the third function, the calculation of the percentage of 2 M NaCl solution was shown in Figure 3.

Figure 3. "Molar Solutions" window and demonstration of calculations

There is a list box in the "Acid & Base Solution" module (Figure 4a). Chemicals in this list box are called from the MS Excel file in the program folder. This Excel file contains the names, formulas, formula weights and equivalents of the chemicals (Figure 4b). However, density and percentage weight values must be entered by the user. This is because these values may differ according to the brands of chemicals used in laboratories. When phosphoric acid is selected from the list and the necessary information is entered, the calculation result is given to the user as a prescription. If new chemicals are added by the researcher without deforming the format of the Excel file, the program will also calculate using up-to-date data.

Figure 4. "Acid&Base Solutions" window (a) and MS Excel form of chemical list (b)

The "Buffer Solutions" module also calls its chemical information from the MS Excel file (Figure 5). If information is entered without distorting the format of the MS Excel file, the program will make calculations using the current data. As an example, Figure 5a shows the calculation for potassium phosphate monobasic.

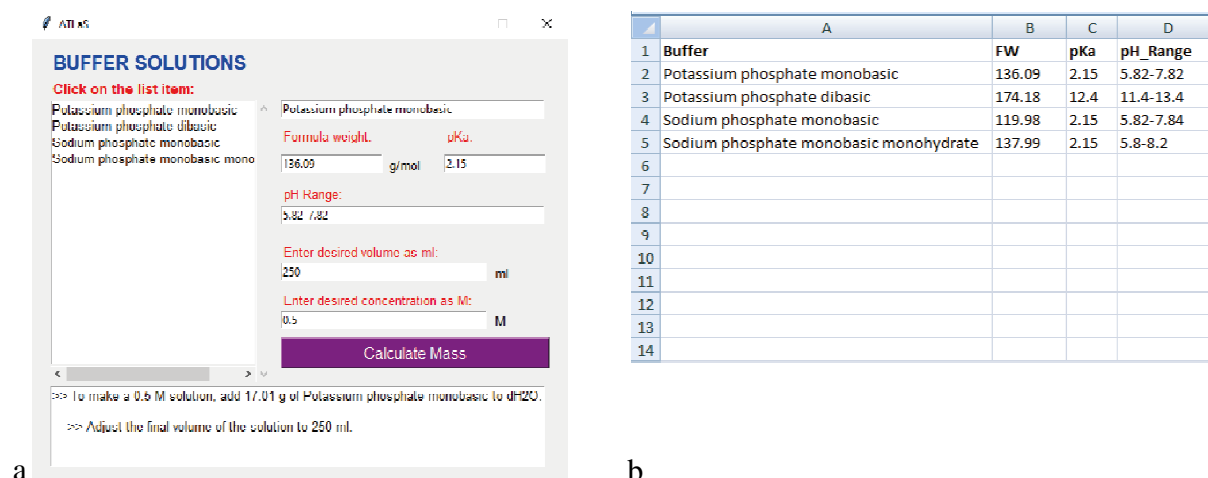a   b

Figure 5. "Buffer Solutions" window (a) and MS Excel form of chemical list (b)

The "Unit Converter" module in ATLaS makes conversions in units of volume, mass and density. When the volume option is selected, microliter, milliliter and liter expressions appear on the radio buttons; when the mass option is selected, microgram, milligram and kilogram expressions appear; when the density option is selected, microgram / ml, milligram / ml and kilogram / L expressions appear. An example is given in Figure 6.

Figure 6. "Unit Converter" window

Important warnings to be aware of when using the program:

1- For decimal numbers, a dot (eg 0.5) must be used.
2- Volume values should be entered in millilitres (ml).
3- Molar values must be entered as molar (M).

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