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## Calculation Menu

This menu can be used to start a new substance or to exit the program. To start a new substance choose this menu item or press the F2 key. To exit the program select exit or press Alt-x.

## Mode Menu

When Auto is selected the gram formula mass and conversions will be done automatically for the student. This is a good place to start when finding molecular weights and doing conversions has just been introduced. When manual is selected the student finds the gfm by clicking on the symbol of the appropriate elements the correct number of times. Conversions are then done by clicking on the appropriate conversion factors in the correct order.

## Random Value

When this is selected a random value for a mass, moles, molecules, or volume(if a gas) will be generated. As an alternative a desired value can be entered by clicking on the new mass, new moles , new molecules , or new volume boxes in the upper left hand corner of the window.

### **Purpose of the program**

When students are first presented with determining gram formula masses and the mole concept there can be a lot of confusion and frustration. This program is designed to make learning this concept easier for the teacher and more fun for the student. It can be presented in either a manual or automatic mode for students of various backgrounds and abilities.

## Solving Conversion Problems

### Auto Mode:

When F2 is pressed in the Automatic mode a dialog box will be presented which is used to choose the substance to be dealt with. The gram formula mass for the selected substance will be presented. A starting quantity then must be chosen so that the conversion portion of the program can begin. To choose a starting value either click on the new mass, new moles, new molecules, or new volume boxes in the upper left hand corner of the window or choose random value. A number will appear under mass, moles, molecules, or volume. To start the conversion process click on the calculate box and the problem will be solved.

### Manual Mode:

When F2 is pressed in the Manual mode a dialog box will be presented which is used to choose the substance to be dealt with. The formula and a series of element windows similar to those on a periodic table will be presented. To find the gram formula mass of the substance the correct symbol must be clicked on the appropriate number of times. When the correct gfm is determined the conversion portion of the program can begin. A starting quantity then must be chosen. To choose a starting value either click on the new mass, new moles, new molecules, or new volume boxes in the upper left hand corner of the window or choose random value. A number will appear under mass, moles, molecules or volume. To start the conversion process click on the calculate box and conversion factors will appear. To solve the problem the student must click on the correct conversion factor(s) in the correct order. When the appropriate solution is selected the numerical answer is calculated by the computer.

## **New Mass**

Click on this box in the upper left hand corner and a dialog box will appear. Enter the value of the mass desired. The value will appear in the grid below the substance. Click on the calculate box to choose the goal unit desired.

## **New Moles**

Click on this box in the upper left hand corner and a dialog box will appear. Enter the value of the new moles desired. The value will appear in the grid below the substance. Click on the calculate box to choose the goal unit desired.



## New Molecules

Click on this box in the upper left hand corner and a dialog box will appear. Enter the value of the new moles desired. The value will appear in the grid below the substance. Click on the calculate box to choose the goal unit desired.

## **New Volume**

Click on this box in the upper left hand corner and a dialog box will appear. Enter the value of the desired volume. The value will appear in the grid below the substance. Click on the calculate box to choose the goal unit desired.

## Exit

To quit the program select this menu item or press Alt-x.

