Stochiometric Combustion Pseudocode	Grade 11 Chemistry

Handout

The following piece of pseudocode takes a given hydrocarbon formula (CxHy) and creates a balanced chemical equation combusting it with O2, then converts from moles to grams to give a stoichiometric ratio of combustion reagents.

```
#Comment: always start by defining constants. We will need molecular
mass in g/mol for this program
LET MolMassC = 12.01
LET MolMassH = 1.007
LET MolMassO = 16.00

#Comment: Now let us define input variables:
LET hydrocarbon be the input, a molecule of only C and H.
LET NumC be number of carbon atoms in hydrocarbon
LET NumH be number of hydrogen atoms in hydrocarbon

#Comment: Now for the variables we will calculate:
LET NumCO2 stand for number of CO2 molecules in balanced equation
LET NumO2 stand for the number of O2 molecules in balanced equation
LET NumH2O stand for number of H2O molecules in balanced equation
LET NumHydrocarbon stand for the number of molecules of the
hydrocarbon in the balanced equation
LET MassHydrocarbon stand for the mass of one mole of the hydrocarbon
LET MassO2 stand for the mass of how many moles of O2 are required to
combust it.
LET Ratio stand for the stoichiometric mass ratio of combustion
reagents

#Comment: check so we have whole numbers of molecules only
IF(NumH/4 is a whole number)
THEN
    #Comment: it's easy!
    NumH2O = NumH/2
    NumCO2 = NumC
    NumHydrocarbon = 1
    NumO2 = NumCO2 + NumH2O/2
ELSE
    #Comment: we need to make it a whole number!
    NumH2O = 4*NumH
    NumCO2 = 4*NumC
    NumHydrocarbon = 4
```

```
    NumO2 = NumCO2 + NumH2O/2


PRINT "The balanced equation is:"
PRINT NumHydrocarbon "C"NumC "H"NumH "+" NumO2 "O2" = NumCO2 "CO2" +
NumH2O "H2O"

PRINT "Each Mol of Hydrocarbon requires" NumO2 "mol of O2 for
complete combustion."

MassHydrocarbon = NumC*MassC + NumH*MassH
MassO2 = 2*(MolMassO)*NumO2

PRINT "Each mol of hydrocarbon weighs" MassHydrocarbon "g and
requires" MassO2 "of oxygen for complete combustion."

Ratio = MassO2/MassHydrocarbon

PRINT "Each g of hydrocarbon requires" Ratio "g of O2 for combustion,
so the stoichiometric mass ratio is 1:"Ratio"
```