1. Mole to Mole Conversions:
Objective: Given the moles or number of atoms of one species be able to predict the moles or atoms of another species consumed or produced from a balanced chemical equation.

(in class)
Analine, ($C_6H_5NH_2$)can be formed from nitro benzene ($C_6H_5NO_2$) by the following equation:

$$4C_6H_5NO_2 + 9Fe + 4H_2O \text{ ---> } 4C_6H_5NH_2 + 3\ Fe_3O_4$$

1.a) Write the conversion factor converting moles iron to moles analine

1.b) How many moles of analine would be formed if 3.78moles of iron was consumed?

(take home)
1.c) Write the conversion factor converting moles nitrobenzene to moles Fe_3O_4 .

1.d) Write the conversion factor describing the ratio of the consumption of iron to the consumption of nitrobenzene.

1.e. How many moles of nitrobenzene would be needed to produce 4.678Mmoles of Fe_3O_4?

1.f) How many moles of iron would be needed to consume $3.56x10^{22}$ molecules of nitrobenzene?

1.g) How many atoms of iron are consumed if 3.59nmoles of water are consumed?

2. **Mass to Mass or Mass to Mole Conversions**
Objective: Given the mass one species be able to predict the mass another species consumed or produced from a balanced chemical equation.

Technique: This is a three step process which should be done in one equation which uses three conversion factors.

Conversion Factor #1: Use molar mass to convert mass of known material to moles.

Conversion Factor #2: Use coefficients of balanced reaction equation to convert moles of known material to moles of desired material.

Conversion Factor # 3: Use molar mass to convert moles of desired material to mass of desired material.

(in class)

Analine, ($C_6H_5NH_2$)can be formed from nitro benzene ($C_6H_5NO_2$) by the following equation:

$4C_6H_5NO_2 + 9Fe + 4H_2O \text{ ---> } 4C_6H_5NH_2 + 3\ Fe_3O_4$
(123.105) (55.845) (18.016) (93.121g/mol) (231.535) g/mol

2.a) How many grams of analine would be formed if 3.78moles of iron was consumed?

2.b) How many grams of nitrobenzene would be needed to produce 4.678 kg of Fe_3O_4?

(take home)

2.c) How many grams of iron would be needed to consume 3.56×10^{22} molecules of nitrobenzene?

2.d) How many grams of iron are consumed if 3.59ng of water are consumed?

2.e) How many grams of analine are produced if 22.45 g of Fe_3O_4 are also produced?