**Stoichiometry: Gram to Gram Calculations**

1. Write a balanced chemical equation.
2. List the given information below the compound.
3. Use a question mark to indicate what you are solving for.
4. Calculate the molar mass for the given compound and the unknown.

÷ M of A

X Mole Ratio

Mass of B  
(grams) m

Moles of B  
(mol) n

Mass of A  
(grams) m

Moles of A  
(mol) n

X B  
 A

x M of B

**Example 1:**

How many grams of oxygen are required to react with 9.7g of magnesium to produce magnesium oxide?

Line:

mO2 = 9.7 g Mg x 1 mol Mg x 1 mol O2 x 31.998 g O2

24.305 g Mg 2 mol Mg mol O2

= 6.4 g O2

Therefore 6.4 g of O2 are required.

Steps:

1. Write out the balanced chemical equation

2 Mg(s) + O2(g) 🡪 2MgO(s)

m 9.7g ?

M 24.305g/mol 31.998g/mol

1. Convert mass to moles

nMg=9.7g x 1 mol

24.305g

=0.3991 mol Mg

1. Use mole ratio to convert between reactants/products

nO2 = 0.3991 mol Mg x 1 mol 02

2 mol Mg

= 0.1996 mol O2

1. Convert moles to mass

mO2 = 0.199g mol x 31.998 g/mol

=6.4 g

Therefore 6.4 g of oxygen gas are required.

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(grams) m

Moles of B  
(mol) n

Mass of A  
(grams) m

Moles of A  
(mol) n

X B  
 A

x M of B

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