26H2O(l) + 6CO2(g) → C6H12O6(s) + 6O2(g) Problem 1

What mass, in grams, of carbon dioxide is needed to react with 3.00 mol of water in this reaction?

2Mg(s) + O2(g) → 2MgO(s) Problem 2

What mass (g) of magnesium oxide is produced from 2.00 mol of magnesium?

5C(s) + 2SO2(g) → CS2(l) + 4CO(g) Problem 3

If 8.00g of SO2 reacts, how many moles of each product are formed?

5C(s) + 2SO2(g) → CS2(l) + 4CO(g) Problem 4

How many grams of carbon monoxide are produced from the reaction of 16.0 g of SO2   
with carbon?

C6H6(l) + Cl2(g) → C6H5Cl(s) + HCl(g) Problem 5

In a lab, 36.8 g of C6H6 react with excess Cl2 and 38.8g of C6H5Cl(s) are produced (actual yield). What is the percent yield of C6H5Cl(s)? hint: calculate theoretical yield)

CO(g) + 2H2(g) → CH3OH(l) Problem 6

If 75.0g of carbon monoxide reacts with excess hydrogen gas to produce 68.4g of methanol, what is the percent yield of methanol?

Find the percent composition of sulfuric acid H2SO4  Problem 7

What is sulfuric acid?

Sulfuric acid at a high [concentration](http://en.wikipedia.org/wiki/Concentration) can cause very serious damage upon contact, since not only does it cause [chemical burns](http://en.wikipedia.org/wiki/Chemical_burn) via [hydrolysis](http://en.wikipedia.org/wiki/Hydrolysis), but also [secondary thermal burns](http://en.wikipedia.org/wiki/Burn#By_depth) through [dehydration](http://en.wikipedia.org/wiki/Dehydration_reaction).

How is it used?

About 60% of produced H2SO4 is consumed for fertilizers, particularly superphosphates, ammonium phosphate and ammonium sulfates. About 20% is used in chemical industry for production of detergents, synthetic resins, dyestuffs, pharmaceuticals, petroleum catalysts, insecticides and [antifreeze](http://en.wikipedia.org/wiki/Antifreeze), as well as in various processes such as oil well acidicizing, aluminium reduction, paper sizing, water treatment. About 6% of uses are related to [pigments](http://en.wikipedia.org/wiki/Pigment) and include paints, [enamels](http://en.wikipedia.org/wiki/Enamel_paint), printing inks, coated fabrics and paper, and the rest is dispersed into a multitude of applications such as production of explosives, [cellophane](http://en.wikipedia.org/wiki/Cellophane), acetate and viscose textiles, lubricants, non-ferrous metals and batteries. Sulfuric acid is used as a defence by certain marine species, for example, the phaeophyte alga *Desmarestia munda* (order [Desmarestiales](http://en.wikipedia.org/wiki/Desmarestiales)) concentrates sulfuric acid in cell vacuoles

Where is it found?

Pure sulfuric acid is not encountered naturally on Earth in anhydrous form, due to its great [affinity for water](http://en.wikipedia.org/wiki/Hygroscopy). Dilute sulfuric acid is a constituent of [acid rain](http://en.wikipedia.org/wiki/Acid_rain), which is formed by atmospheric [oxidation](http://en.wikipedia.org/wiki/Redox) of [sulfur dioxide](http://en.wikipedia.org/wiki/Sulfur_dioxide) in the presence of [water](http://en.wikipedia.org/wiki/Water_(molecule)) – i.e., oxidation of [sulfurous acid](http://en.wikipedia.org/wiki/Sulfurous_acid). Sulfur dioxide is the main byproduct produced when sulfur-containing fuels such as coal or oil are burned. Sulfuric acid is produced in the upper atmosphere of [Venus](http://en.wikipedia.org/wiki/Venus) by the [Sun](http://en.wikipedia.org/wiki/Sun)'s [photochemical](http://en.wikipedia.org/wiki/Photochemistry) action on [carbon dioxide](http://en.wikipedia.org/wiki/Carbon_dioxide), [sulfur dioxide](http://en.wikipedia.org/wiki/Sulfur_dioxide), and [water](http://en.wikipedia.org/wiki/Water) vapor.

Is it legal?

International commerce of sulfuric acid is controlled under the [United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, 1988](http://en.wikipedia.org/wiki/United_Nations_Convention_Against_Illicit_Traffic_in_Narcotic_Drugs_and_Psychotropic_Substances), which lists sulfuric acid under Table II of the convention as a chemical frequently used in the illicit manufacture of narcotic drugs or psychotropic substances

Problem 8

A 13.60 g sample of a compound containing only magnesium and oxygen is decomposed and 5.40 g of oxygen is obtained. What is the percent composition of each element in the compound?

Problem 9

Find the percent composition of copper (II) phosphate (hint: use formulas and naming flowcharts! (back of yellow BFF 3.0)

Problem 10

Find the percent composition of each element in Al(C2H3O2)3

Make sure to account for ALL subscripts!

Limiting Reactants Problem 11

You are given 60 g CCl4 and 60 g MgS. Determine the limiting reactant and how many grams MgCl2 are produced.

CCl4 + 2MgS → CS2 + 2MgCl2

Problem 12

You are given 8 g NaOH and 14 g of HCl. Determine the limiting reactant and how many grams of NaCl are produced.

NaOH + HCl → NaCl + H2O