

1	Ammonia (NH ₃) is the active ingredient in many kitchen cleansers. How many atoms are in 3.40 grams of ammonia?
2	Copper(II) chloride reacts w/sodium nitrate to produce copper(II) nitrate and sodium chloride. If 20.0 g of copper(II) chloride react with sodium nitrate, what mass of sodium chloride is formed?
3	Hydrogen sulfide, given off by decaying organic matter, is converted to sulfur dioxide in the atmosphere by the reaction: $2 \text{H}_2\text{S}(\text{g}) + 3 \text{O}_2(\text{g}) \rightarrow 2 \text{SO}_2(\text{g}) + 2 \text{H}_2\text{O}(\text{l})$ How many moles of H ₂ S are required to form 8.20 moles of SO ₂ ?
4	Hydrogen sulfide, given off by decaying organic matter, is converted to sulfur dioxide in the atmosphere by the reaction: $2 \text{H}_2\text{S}(\text{g}) + 3 \text{O}_2(\text{g}) \rightarrow 2 \text{SO}_2(\text{g}) + 2 \text{H}_2\text{O}(\text{l})$ How many grams of water are produced from 6.82 g H ₂ S?
5	Copper(II) chloride reacts w/sodium nitrate to produce copper(II) nitrate and sodium chloride. If 20.0 g of copper(II) chloride react with sodium nitrate, how many molecules of copper (II) nitrate are produced
6	How many grams does 0.500 moles of CuBr weigh?
7	How many moles of oxygen are made if 12.0 moles of potassium chlorate react? $2 \text{KClO}_3 \rightarrow 2 \text{KCl} + 3 \text{O}_2$
8	How many grams of potassium chloride are produced from 2.50 g of potassium and excess chlorine? $2 \text{K} + \text{Cl}_2 \rightarrow 2 \text{KCl}$
9	How many grams of oxygen are produced in the decomposition of 5.00 grams of potassium chlorate? $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$

10	Using the following equation: $\text{Pb}(\text{SO}_4)_2 + 4 \text{LiNO}_3 \rightarrow \text{Pb}(\text{NO}_3)_4 + 2 \text{Li}_2\text{SO}_4$ How many grams of lithium nitrate will be needed to make 250 grams of lithium sulfate, assuming that you have an adequate amount of lead (IV) sulfate to do the reaction?
11	$\text{Fe} + \text{HCl} \rightarrow \text{FeCl}_3 + \text{H}_2$ How many molecules of Fe is required to generate 6 moles of H ₂ gas?
12	If 7.0 moles of HCl is added to enough iron that the HCl is completely used up, how much hydrogen gas will be produced? $\text{Fe} + \text{HCl} \rightarrow \text{FeCl}_3 + \text{H}_2$
13	$\text{Li}_2\text{CO}_3 \rightarrow \text{Li}_2\text{O} + \text{CO}_2$ In order to produce 2 moles of carbon dioxide gas, how many grams of lithium carbonate is required?
14	$\text{Na}_2\text{O} + \text{CO}_2 \rightarrow \text{Na}_2\text{CO}_3$ In order to produce 7 moles of Na ₂ CO ₃ , how many molecules of Na ₂ O is required?
15	$\text{Ca}(\text{OH})_2 + \text{H}_3\text{PO}_4 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$ How many grams of Ca(OH) ₂ is required to generate 9 moles of H ₂ O?
16	$\text{Cr}_2(\text{SO}_3)_3(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{Cr}_2(\text{SO}_4)_3(\text{aq}) + \text{SO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$ If 1.800×10^{24} molecules of Cr ₂ (SO ₃) ₃ reacts completely, what mass of water will be produced?
17	$\text{Cr}_2(\text{SO}_3)_3(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{Cr}_2(\text{SO}_4)_3(\text{aq}) + \text{SO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$ If 30.00 g of Cr ₂ (SO ₃) ₃ reacts completely, what number of molecules of H ₂ SO ₄ is required?
18	If 25.0 g of iron(III) phosphate react with excess sodium sulfate, how many grams of iron(III) sulfate can be made? $2 \text{FePO}_4 + 3 \text{Na}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + 2 \text{Na}_3\text{PO}_4$

19	What mass of sodium hydroxide is made from 1.20×10^2 g of sodium oxide? $\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow 2 \text{NaOH}$
20	A human needs about 120. grams of glucose per day. How many grams of carbon dioxide are used by plants to produce this amount of glucose? $6 \text{CO}_2 + 6 \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2$
21	$2 \text{NaClO}_3 \rightarrow 2 \text{NaCl} + 3 \text{O}_2$ How many molecules of oxygen are produced when 80.0 grams of sodium chloride are produced?
22	How many moles of copper react with 3.50 moles of silver nitrate? $\text{Cu} + 2 \text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2 \text{Ag}$
23	Chlorine is used by textile manufacturers to bleach cloth. Excess chlorine is destroyed by its reaction with sodium thiosulfate, $\text{Na}_2\text{S}_2\text{O}_3$: $\text{Na}_2\text{S}_2\text{O}_3(\text{aq}) + 4\text{Cl}_2(\text{g}) + 5\text{H}_2\text{O}(\text{aq}) \rightarrow 2\text{NaHSO}_4(\text{aq}) + 8\text{HCl}(\text{aq})$ How many moles of H_2O react if 5.24×10^{19} molecules of HCl are formed?
24	The incandescent white of a fireworks display is caused by the reaction of phosphorous with O_2 to give P_4O_{10} . How many grams of P are needed to make 7.46g P_4O_{10} ?
25	The explosive known as TNT (trinitrotoluene) is very useful because all of the energy is stored in the TNT, so the explosion can occur even if there is no oxygen present. The explosion of TNT is a decomposition reaction: $2 \text{C}_7\text{H}_5\text{N}_3\text{O}_6 \rightarrow 7 \text{CO} + 7 \text{C} + 5 \text{H}_2\text{O} + 3 \text{N}_2$ A forensic chemist who happens to be exceptionally good as his job is investigating the site of a TNT blast is able to determine that there are 351 grams of carbon residue left by the explosion. How many grams of TNT were used for the explosion?
26	$2 \text{H}_2\text{S} + 3 \text{O}_2 \rightarrow 2 \text{H}_2\text{O} + 2 \text{SO}_2$ What mole ratios can be made from this reaction? Hint: Here's one: 2 mol H_2S : 3 mol O_2

27	How many moles of sodium atoms correspond to 1.56×10^{21} atoms of sodium?
28	Caustic soda, NaOH , can be prepared commercially by the reaction of Na_2CO_3 with slaked lime, $\text{Ca}(\text{OH})_2$. how many g of NaOH can be obtained by treating 1.000 kg of Na_2CO_3 with $\text{Ca}(\text{OH})_2$?
29	How many g of CaCl_2 does it take to produce 14.3 g of AgCl when treated with excess AgNO_3 ? $\text{Ca}(\text{NO}_3)_2$ is the other product.
30	A 0.6000 mol sample of Cu_2S is roasted in excess oxygen to yield copper metal and sulfur dioxide. Calculate the mass of copper metal produces.
31	The human body needs at least 1.03×10^{-2} mol O_2 every minute. If all of this oxygen is used for the cellular respiration reaction that breaks down glucose, how many grams of glucose does the human body consume each minute? $\text{C}_6\text{H}_{12}\text{O}_6(\text{s}) + 6 \text{O}_2(\text{g}) \rightarrow 6 \text{CO}_2(\text{g}) + 6 \text{H}_2\text{O}(\text{l})$
32	$\text{Cu} + 2 \text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2 \text{Ag}$ If 89.5 grams of silver were produced, how many grams of copper reacted?
33	How many moles are there in 2.35×10^{24} molecules of water?
34	How many grams does 5.60×10^{22} molecules of SiO_2 weigh?
35	If 20.0 grams of zinc react with excess hydrochloric acid, how many grams of zinc chloride are produced? $\text{Zn} + \text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
36	How many grams of chlorine gas must be reacted with excess sodium iodide if 10.0 grams of sodium chloride are needed? $\text{NaI} + \text{Cl}_2 \rightarrow \text{NaCl} + \text{I}_2$

