WORD EQUATIONS   BOSS A   LEVEL 2

Aluminium reacts with oxygen to form aluminium oxide. Write down the word equation for this reaction.

WORD EQUATIONS   BOSS C   LEVEL 2

Iron reacts with oxygen to form iron(III)oxide. Write down the word equation for this reaction.

WORD EQUATIONS   BOSS B   LEVEL 2

Ammonia reacts to form nitrogen and hydrogen. Write down the word equation for this reaction.

WORD EQUATIONS   BOSS D   LEVEL 3

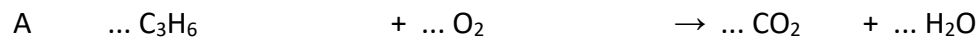Glucose decomposes to carbon, oxygen and hydrogen. Write down the word equation for this reaction.

BALANCING R.E.   BOSS A   LEVEL 2
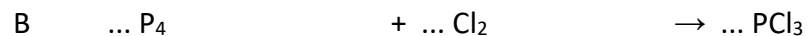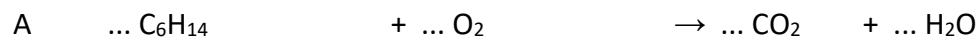
Copy the following reaction equations and balance them:

A   ... C_3H_6 + ... O_2 → ... CO_2 + ... H_2O

B   ... S_8 + NaCl   → ... Na_2S + ... Cl_2

BALANCING R.E.   BOSS C   LEVEL 2

Copy the following reaction equations and balance them:

A   ... C_6H_{14} + ... O_2 → ... CO_2 + ... H_2O

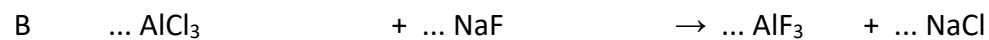B   ... P_4 + ... Cl_2 → ... PCl_3

BALANCING R.E.   BOSS B   LEVEL 2

Copy the following reaction equations and balance them:

A   ... C_5H_{10} + ... O_2 → ... CO_2 + ... H_2O

B   ... $AlCl_3$ + ... NaF   → ... AlF_3 + ... NaCl

BALANCING R.E.   BOSS D   LEVEL 3

Copy the following reaction equations and balance them:
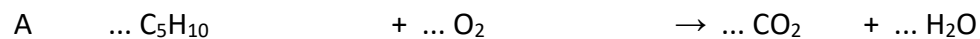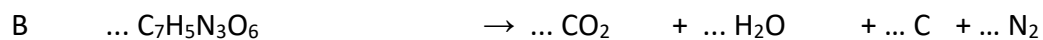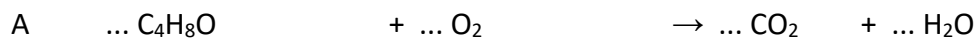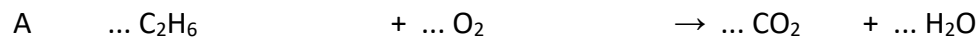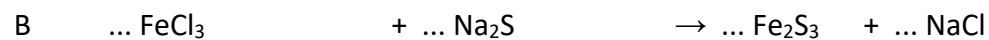
A   ... C_4H_8O + ... O_2 → ... CO_2 + ... H_2O

B   ... $C_7H_5N_3O_6$ → ... CO_2 + ... H_2O + ... C + ... N_2

Copy the following reaction equations and balance them:

A   ... C_2H_6 + ... O_2 → ... CO_2 + ... H_2O

B   ... $ZnCl_2$ + ... Na_2O → ... ZnO + ... $NaCl$

Copy the following reaction equations and balance them:

A   ... C_8H_{16} + ... O_2 → ... CO_2 + ... H_2O

B   ... Al_2O_3 + ... CO → ... Al + ... CO_2

Copy the following reaction equations and balance them:

A   ... C_4H_6 + ... O_2 → ... CO_2 + ... H_2O

B   ... $FeCl_3$ + ... Na_2S → ... Fe_2S_3 + ... $NaCl$

Copy the following reaction equations and balance them:

A   ... C_5H_8 + ... O_2 → ... CO_2 + ... H_2O

B   ... PbO_2 + ... CO → ... Pb + ... CO_2
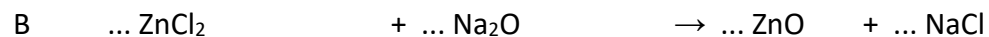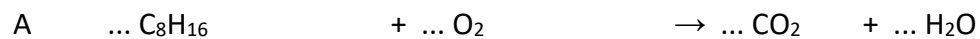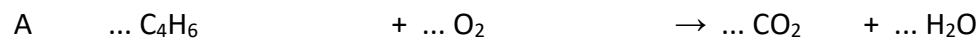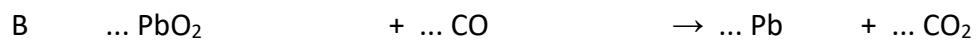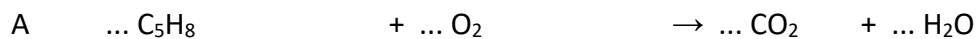
R.E. WITH GROUPS   BOSS A   LEVEL 2

Copy the following reaction equations and balance them:

A   ... $FeSO_4$ + ... Al → ... $Al_2(SO_4)_3$ + ... Fe

B   ... $FeCl_3$ + ... K_2CO_3 → ... $Fe_2(CO_3)_3$ + ... KCl
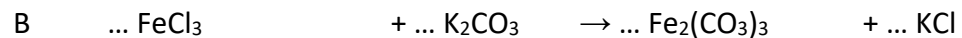
R.E. WITH GROUPS   BOSS C   LEVEL 2

Copy the following reaction equations and balance them:

A   ... $FeSO_4$ + ... Al → ... $Al_2(SO_4)_3$ + ... Fe

B   ... NH_4Cl + ... Fe_2S_3 → ... $(NH_4)_2S$ + ... $FeCl_3$
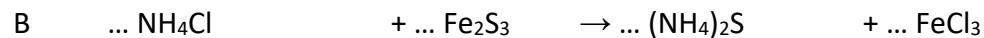
R.E. WITH GROUPS   BOSS B   LEVEL 2

Copy the following reaction equations and balance them:

A   ... $Pb(SO_4)_2$ + ... $BaCl_2$ → ... $BaSO_4$ + ... $PbCl_4$

B   ... $AlCl_3$ + ... $MgCO_3$ → ... $Al_2(CO_3)_3$ + ... $MgCl_2$
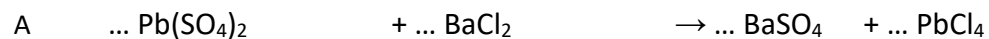
R.E. WITH GROUPS   BOSS D   LEVEL 3

Copy the following reaction equations and balance them:

A   ... $Pb(SO_4)_2$ + ... $Ba(NO_3)_2$ → ... $BaSO_4$ + ... $Pb(NO_3)_4$

B   ... $Fe(OH)_3$ + ... Na_2CO_3 → ... $Fe_2(CO_3)_3$ + ... $NaOH$
.
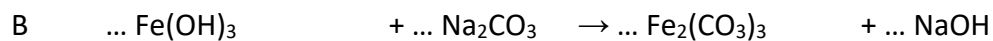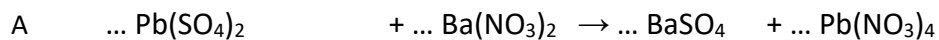
COMBUSTION REACTIONS BOSS A   LEVEL 2

For the following complete combustion reactions, copy and balance them:

A   ... C_7H_{14} + ... O_2 $\rightarrow$

B   ... C_2S_2 + ... O_2 $\rightarrow$

COMBUSTION REACTIONS BOSS C   LEVEL 2

For the following complete combustion reactions, copy and balance them:

A   ... C_6H_{10} + ... O_2 $\rightarrow$

B   ... H_2S_2 + ... O_2 $\rightarrow$

COMBUSTION REACTIONS BOSS B   LEVEL 2

For the following complete combustion reactions, copy and balance them:

A   ... C_8H_{14} + ... O_2 $\rightarrow$

B   ... C_3S_2 + ... O_2 $\rightarrow$

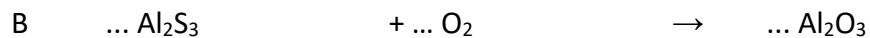## COMBUSTION REACTIONS BOSS D   LEVEL 3

For the following complete combustion reactions, copy and balance them:

A   ... $C_6H_{12}O_6$ + ... O_2 $\rightarrow$

B   ... Al_2S_3 + ... O_2 $\rightarrow$ ... Al_2O_3

MAKING R.E. BOSS A LEVEL 2

Give the word equation and the reaction equation for the following reactions:

A   The reaction of chlorine with hydrogen to form hydrogenchloride (HCl).

B   The complete combustion of octane octaan (C_8H_{18}).

MAKING R.E. BOSS C LEVEL 2

Give the word equation and the reaction equation for the following reactions:

A   The decomposition of iron(III)oxide (Fe_2O_3) to iron and oxygen.

B   The complete combustion of methanethiol (CH_4S).

MAKING R.E. BOSS B LEVEL 2

Give the word equation and the reaction equation for the following reactions:

A   The reaction of dinitrogen monoxide (N_2O) and carbon monoxide (CO) to form nitrogen and carbon dioxide (CO_2).

B   The complete combustion of sulphur.

MAKING R.E. BOSS D LEVEL 3

Give the word equation and the reaction equation for the following reactions:

A   The reaction of sulphuric acid (H_2SO_4) and aluminium tot aluminium sulfaphate ($Al_2(SO_4)_3$) and hydrogen.

B   The complete combustion of 1-sulfanylpropane-2-ol ($C_4H_{10}SO$).

A   Write down the molecular formula of a substance with six hydrogen atoms, two carbon atoms, one oxygen atom and one nitrogen atom.

B   Write down which types of atoms are present in C_3H_6S and how many times each type of atom is present.

A   Write down the molecular formula of a substance with six hydrogen atoms, two carbon atoms, one chlorine atom and four oxygen atoms.

B   Write down which types of atoms are present in $CaCO_3$ and how many times each type of atom is present.

A   Write down the molecular formula of a substance with five hydrogen atoms, three carbon atoms, one nitrogen atom and three bromine atoms.

B   Write down which types of atoms are present in Na_2SO_4 and how many times each type of atom is present.
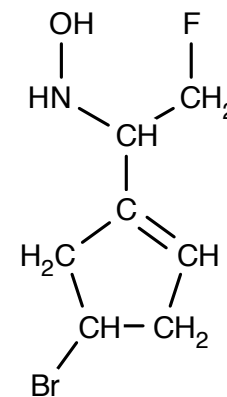
Write down the molecular formula of the following substance:

Calculate the molecular mass of the following substances. You can use the appendix in your book.

A $C_2H_4O_2$

B $Na_2Si_2O_5$

Calculate the molecular mass of the following substances. You can use the appendix in your book.

A $C_2H_4S_2$

B $Ca_3Si_2O_7$

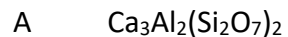Calculate the molecular mass of the following substances. You can use the appendix in your book.

A $C_2H_8N_2$

B $Al_2Si_2O_7$

Calculate the molecular mass of the following substances. You can use the appendix in your book.

A $Ca_3Al_2(Si_2O_7)_2$

B NH_4OH

LAVOISIER'S LAW — BOSS A — LEVEL 2

Iron(II)oxide reacts with carbon monoxide to form iron and carbon dioxide. Calculate the combined mass of the carbon dioxide and iron that are formed during the reaction when 79.9 g of iron(III)oxide reacts with 42.0 g of oxygen.

LAVOISIER'S LAW — BOSS C — LEVEL 2

Iron(II)oxide reacts with carbon monoxide to form iron and carbon dioxide. Calculate the combined mass of the carbon dioxide and iron that are formed during the reaction when 159.8 g of iron(III)oxide reacts with 84.0 g of oxygen.

LAVOISIER'S LAW — BOSS B — LEVEL 2

Iron(II)oxide reacts with carbon monoxide to form iron and carbon dioxide. Calculate the combined mass of the carbon dioxide and iron that are formed during the reaction when 40.0 g of iron(III)oxide reacts with 21.0 g of carbon monoxide.

LAVOISIER'S LAW — BOSS D — LEVEL 3

When 180 grams of sugar is decomposed, 72 grams of carbon, 96 grams of oxygen and a certain amount of hydrogen. Calculate the mass of the hydrogen that is formed during the reaction.

UNIT — BOSS A — LEVEL 2

Convert the following units:

A   2,0 mg = … g

B   2,0 cm^3 = … L

C   3,2 kg = … mg

D   7,1 mL = … dm^3

UNIT — BOSS C — LEVEL 2

Convert the following units:

A   7,0 g = … kg

B   6,2 dm^3 = … mL

C   4,2 mg = … g

D   2,1 mL = …L

UNIT — BOSS B — LEVEL 2

Convert the following units:

A   5,6 g = … mg

B   2,2 dm^3 = … mL

C   5,2 g = … kg

D   4,4 L = … cm^3

UNIT — BOSS D — LEVEL 3

Convert the following units:

A   7,2 ton = … g

B   9,2 mL = … m^3

C   3,7 g/L = … kg/m^3

D   1,8 g/cm^3 = … g/L

MASS RATIO — BOSS A — LEVEL 2

Carbon reacts with oxygen to form carbon monoxide. 6.0 Grams of carbon reacts with 8.0 grams of oxygen. What is the mass ratio in which carbon and oxygen react?

MASS RATIO — BOSS C — LEVEL 2

Carbon monoxide reacts with oxygen to form carbon dioxide. 14.0 Grams of carbon monoxide reacts with 16.0 grams of oxygen. What is the mass ratio in which carbon monoxide and oxygen react?

MASS RATIO — BOSS B — LEVEL 2

Carbon reacts with oxygen to form carbon dioxide. 6.0 grams of carbon reacts with 16.0 grams of oxygen. What is the mass ratio in which carbon and oxygen react?

MASS RATIO — BOSS D — LEVEL 3

Propane reacts with oxygen to form water and carbon dioxide. 22.0 grams of propane reacts with 80.0 grams of oxygen. During the reaction, 66.0 grams of carbon dioxide and 36.0 grams of water are formed. What is the mass ratio in which oxygen reacts and water is formed?

3,0 cm^3 of copper has a mass of 23,7 grams. Calculate the density of copper in g/cm^3.

Alcohol has a density of 800 g/L. Calculate the mass of 300 mL alcohol.

Carbon dioxide has a density of 2,0 g/L. Calculate the volume in L of 50 grams carbon dioxide.

The density of copper is 7,9 g/cm^3. The density of zinc is 7,1 g/cm^3. Frits has 0,030 L of an alloy consisting of 85 volume% zinc en 15 volume% copper. Calculate the total mass of the alloy.

CALCULATE MASS RATIO   BOSS A   LEVEL 2

Calculate the mass ratio in which FeS reacts and Fe_2O_3 is formed.

4 FeS   + 7 O_2 → 2 Fe_2O_3 + 4 SO_2

CALCULATE MASS RATIO   BOSS C   LEVEL 2

Calculate the mass ratio in which FeS reacts and SO_2 is formed.

4 FeS   + 7 O_2 → 2 Fe_2O_3 + 4 SO_2

CALCULATE MASS RATIO   BOSS B   LEVEL 2

Calculate the mass ratio in which O_2 reacts and Fe_2O_3 is formed.

4 FeS   + 7 O_2 → 2 Fe_2O_3 + 4 SO_2

CALCULATE MASS RATIO   BOSS D   LEVEL 3

Calculate the mass ratio in which C_4H_8 reacts and CO_2 is formed. Balance the equation first.

C_4H_8 + O_2 → CO_2 + H_2O

| CALCULATIONS I | BOSS A | LEVEL 2 |

Calcium and oxygen react in a mass ratio of 20.0 : 16.0 to form calcium oxide. Calculate the mass of oxygen that reacts when 4.5 grams of calcium oxide is formed.

| CALCULATIONS I | BOSS C | LEVEL 2 |

Sodium and oxygen react in a mass ratio of 23.0 : 8.0 to form sodium oxide. Calculate the mass of sodium oxide that is formed when 4.2 grams of sodium reacts.

| CALCULATIONS I | BOSS B | LEVEL 2 |

Potassium and oxygen react in a mass ratio of 39.0 : 8.0 to form potassium oxide. Calculate the mass of potassiumn that reacts when 7.2 grams of oxygen reacts.

| CALCULATIONS I | BOSS D | LEVEL 3 |

Potassium and oxygen react in a mass ratio of 39.1 : 8.0 to form potassium oxide. Calculate the mass of potassium oxide that is formed when 3.0 grams of potassium reacts.

Calculate the mass in grams of H_2O that is formed when 12.0 grams of KOH reacts with sufficient H_3PO_4.

3 KOH   + H_3PO_4 → K_3PO_4 + 3 H_2O

Calculate the mass in grams of NaOH that reacts when 3.5 g Na_2S is formed.

2 NaOH   + K_2S → 2 KOH   + Na_2S

Calculate the mass is grams of Fe that is formed when 5.3 grams of Fe_2O_3 reacts with sufficient Al.

2 Al   + Fe_2O_3 → Al_2O_3 + 2 Fe

Calculate the volume in mL of CO_2 that is formed when 30.0 g C_4H_4O reacts. The density of CO_2 is 1.98 g/L.

2 C_4H_4O + 9 O_2 → 8 CO_2 + 4 H_2O
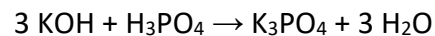
7.5 grams of KOH and 20.0 grams of H_3PO_4 are in a closed of space and react in accordance to the reaction equation below. Calculate which substance is in excess and how large the surplus is. Try to calculate the mass ratio between KOH and H_3PO_4 yourself. If you can't, assume that it is 14.0 : 24.5.
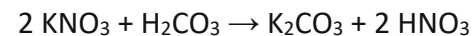
$$3\ KOH + H_3PO_4 \rightarrow K_3PO_4 + 3\ H_2O$$

7.5 grams of KNO_3 and 23.0 grams of H_2CO_3 are in a closed of space and react in accordance to the reaction equation below. Calculate which substance is in excess and how large the surplus is. Try to calculate the mass ratio between KNO_3 and H_2CO_3 yourself. If you can't, assume that it is 50,6 : 15,5.

$$2\ KNO_3 + H_2CO_3 \rightarrow K_2CO_3 + 2\ HNO_3$$

32.0 grams of SnO_2 and 1.5 grams of H_2 are in a closed of space and react in accordance to the reaction equation below. Calculate which substance is in excess and how large the surplus is. Try to calculate the mass ratio between SnO_2 and H_2 yourself. If you can't, assume that it is 66.0 : 1.0.
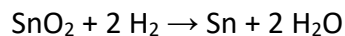
$$SnO_2 + 2\ H_2 \rightarrow Sn + 2\ H_2O$$

34,4 g FeS an 70,9 g O_2 are in a closed of space and react in accordance to the reaction equation below. Calculate the mass in grams of Fe_2O_3 that is formed and the mass in grams of SO_2 that is formed from this reaction. Keep in mind that one of the reactants could be in excess.

$$4\ FeS + 7\ O_2 \rightarrow 2\ Fe_2O_3 + 4\ SO_2$$