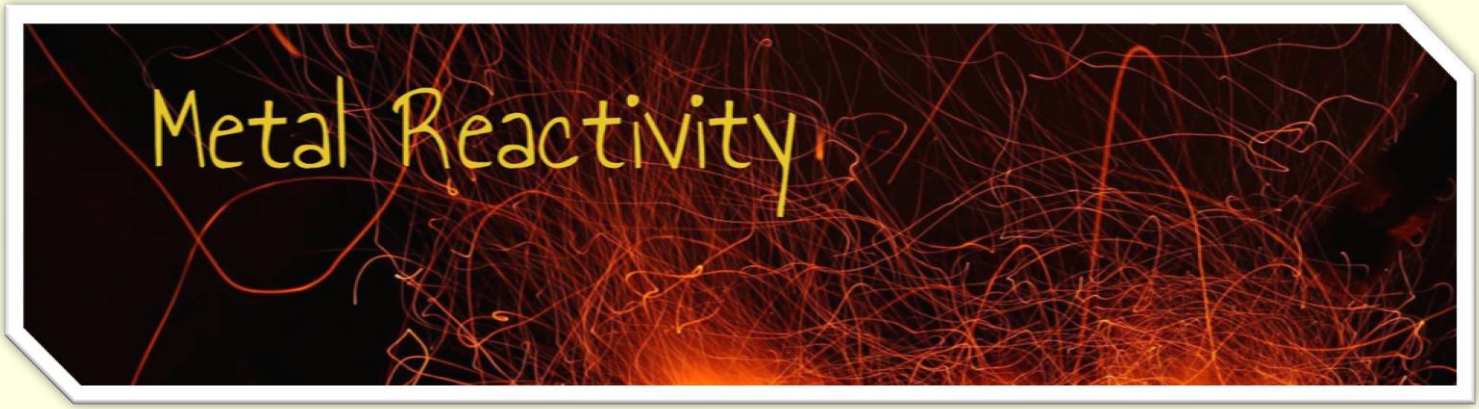

Answer all the questions below then check your answers

1 What is the reactivity series for metals?

2 Study the table below and answer all the questions.

<table>
<tr><th rowspan="2">Metal</th><th colspan="3">Reaction with</th></tr>
<tr><th>Oxygen</th><th>dilute Hydrochloric acid</th><th>Water</th></tr>
<tr><td>Potassium</td><td rowspan="8">Burns when heated to form a metal oxide ⇩</td><td rowspan="2">Explodes in acid</td><td rowspan="3">Reacts with cold water to form hydrogen gas. ⇩</td></tr>
<tr><td>Sodium</td></tr>
<tr><td>Lithium</td><td rowspan="7">Reacts to form metal chloride and hydrogen gas. ⇩</td></tr>
<tr><td>Calcium</td></tr>
<tr><td>Magnesium</td></tr>
<tr><td>Aluminium</td><td rowspan="3">No reaction with cold water. Reacts with steam to form hydrogen</td></tr>
<tr><td>Zinc</td></tr>
<tr><td>iron</td></tr>
<tr><td>Tin</td><td rowspan="4">Metal oxide forms slowly on heating</td><td rowspan="5">No reaction ⇩</td><td rowspan="6">No reaction ⇩</td></tr>
<tr><td>Lead</td></tr>
<tr><td>Copper</td></tr>
<tr><td>Mercury</td></tr>
<tr><td>Silver</td><td rowspan="2">No reaction</td></tr>
<tr><td>Gold</td></tr>
</table>

a. Name a metal that reacts with oxygen on heating. Name a metal that does not react with oxygen

b. Write a word and balanced symbolic equation for the reaction of (if you need help with working out chemical formula click here):

i calcium metal with oxygen gas to form calcium oxide (CaO).

ii Magnesium metal with oxygen gas to form magnesium oxide (MgO). .

iii Calcium with water to form calcium hydroxide ($Ca(OH)_2$) and hydrogen gas.

iv Magnesium with water and magnesium with steam.

c. What gas is produced when a metal is added to water? How could you test this gas to prove your answer is correct?

d. Name a metal that reacts slowly with oxygen on heating.

e. Name a metal that reacts violently with hydrochloric acid and a metal that reacts slowly with acid.

f. Name a metal that does not react with cold water but reacts with steam.

g. Name a metal that reacts with hydrochloric acid but will not react with water.

3 Using the information in question 2 to explain why gold and silver occur naturally but metals like aluminium and calcium are never found uncombined.

Metal reactivity

Answer all the questions below then check your answers

1 What is the reactivity series for metals? List which places the metals in order of reactivity with the most reactive at the top and the least reactive at the bottom of the list. The metals become less reactive as you descend the list.

2 Study the table below and answer all the questions.

<table>
<tr><th rowspan="2">Metal</th><th colspan="3">Reaction with</th></tr>
<tr><th>Oxygen</th><th>dilute Hydrochloric acid</th><th>Water</th></tr>
<tr><td>Potassium</td><td rowspan="8">Burns when heated to form a metal oxide ⇩</td><td rowspan="2">Explodes in acid</td><td rowspan="3">Reacts with cold water to form hydrogen gas. ⇩</td></tr>
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<tr><td>Lithium</td><td rowspan="7">Reacts to form metal chloride and hydrogen gas. ⇩</td></tr>
<tr><td>Calcium</td></tr>
<tr><td>Magnesium</td></tr>
<tr><td>Aluminium</td><td rowspan="3">No reaction with cold water. Reacts with steam to form hydrogen</td></tr>
<tr><td>Zinc</td></tr>
<tr><td>iron</td></tr>
<tr><td>Tin</td><td rowspan="4">Metal oxide forms slowly on heating</td><td rowspan="5">No reaction ⇩</td></tr>
<tr><td>Lead</td></tr>
<tr><td>Copper</td></tr>
<tr><td>Mercury</td></tr>
<tr><td>Silver</td><td rowspan="2">No reaction</td></tr>
<tr><td>Gold</td></tr>
</table>

a. Name a metal that reacts with oxygen on heating. Name a metal that does not react with oxygen any above mercury reacts with oxygen on heating; gold and silver do not react.

b. Write a word and balanced symbolic equation for the reaction of:
If you are unsure how to work out formula for compounds visit the finding the formula page under the quantitative chemistry section on the index page.

i calcium metal with oxygen gas to form calcium oxide (CaO).

Calcium + oxygen ⟶ calcium oxide

$2Ca + O_2 \longrightarrow 2CaO$

ii Magnesium metal with oxygen gas to form magnesium oxide (MgO). .

magnesium + oxygen ⟶ magnesium oxide

$2Mg + O_2 \longrightarrow 2MgO$

iii Calcium with water to form calcium hydroxide ($Ca(OH)_2$) and hydrogen gas.

calcium + water ⟶ calcium hydroxide + hydrogen

$Ca + 2H_2O \longrightarrow Ca(OH)_2 + H_2$

iv Magnesium with water and magnesium with steam.

magnesium + water ⟶ magnesium oxide + hydrogen

$Mg + H_2O \longrightarrow MgO + H_2$

magnesium + steam ⟶ magnesium oxide + hydrogen

$Mg + H_2O \longrightarrow MgO + H_2$

c. What gas is produced when a metal is added to water? How could you test this gas to prove your answer is correct? Hydrogen gas, place a burning splint into mouth of test-tube full of this gas, if it burns with a "pop" then its hydrogen gas!

d. Name a metal that reacts slowly with oxygen on heating.
Tin, lead copper or mercury

e. Name a metal that reacts violently with hydrochloric acid and a metal that reacts slowly with acid. Potassium is violent reaction and lead is slow reaction with acid

f. Name a metal that does not react with cold water but reacts with steam.

Aluminium, zinc or iron

g. Name a metal that reacts with hydrochloric acid but will not react with water.
Aluminium metal

3 Using the information in question 2 to explain why gold and silver occur naturally but metals like aluminium and calcium are never found uncombined.
Gold and silver are close to the bottom of the reactivity series so are unreactive, aluminium and calcium are far too reactive metals to occur as elements, they are high up the reactivity series so will react easily with oxygen and water in the air.