### 15/09/2014 chemistry lesson plan

#### Aim:

1. Four definitions of oxidation and reduction
2. Oxidising and reducing agents

For each example, ask students:

1. Which chemical is oxidised and which one is reduced?
2. Which chemical is the reductant and which one is the oxidant?

#### Lesson

1. Roll
2. Recap: What does redox mean. Give examples of apples and cars ( no video is required). Give the reaction of Mg and O2 as an example.
3. The first definition of oxidation: Oxidation is a gain of oxygen.
4. Dye video
5. Mg is oxidised by O2, so O2 is the oxidising agent/oxidant/oxidiser.
6. Examples: O2, MnO4-, Cr2O72-, H2O2, Cl2, Br2, I2,
7. Mg is oxidised by oxygen, what about Oxygen? Reduction and oxidation happen at the same time. Oxygen is reduced by magnesium. Magnesium is the reducing agent/reducer/reductant. Reactive metals, I-, Br-  are examples of a reducing agent.
8. The first definition of reduction, reduction is a loss of oxygen.

Fe2O3 +CO= Fe + CO2  high temperature. (Does not have oxygen involved in the redox)

1. Second example: methane reacting with oxygen.
2. Second definition of redox. Oxidation is a loss of hydrogen and reduction is a gain of hydrogen.
3. The first two definitions are not the general definitions of the redox.

Important points: Oxidation and reduction happen at the same time.

 One chemical species is oxidised while the other one is reduced.

 The reaction involving oxygen is a redox whereas a redox reaction does not necessarily have oxygen in the system.

1. The general definition of redox involves electron transfer.

Use Mg + O2, Fe2O3 +CO and CH4 +O2 as the examples to show electron transfer. ( may use the idea of a half equation)

1. The two general definitions: oxidiation is a loss of electrons while reduction is a gain of electrons. Use lending and borrowing coins as an example. Oxidation is the chemical process where a chemical species increases in its oxidation state whereas reuduction is the chemical process where a chemical decreases its oxidation state.
2. More examples:

Video: https://www.youtube.com/watch?v=afxwDTz\_JTk

Mg in HCl

video: <https://www.youtube.com/watch?v=I2t_Sg3A7MQ>

chlorine reacting with bromide and iodide ions

Mg reacting with copper sulphate, chlorine reacting with iodide in solution.

<https://www.youtube.com/watch?v=UkL79QO2qGQ>

Copper and silver nitrate

1. Take notes and Summary

## Lesson plan 22/09/2014

Aim: More practice on OS assignment and identify oxidants & reductants

1. Youtube video on how to assign oxidation numbers. (10 min)

<http://www.youtube.com/watch?v=81WdyqvLlVA>

1. Check if students need more time to practice. ( 15-20 min)
2. Check understanding and how students assign oxidation numbers by going through a couple of questions (3 examples is good) on the board. ( 6 min)
3. **Explicit Teaching:**

The change in oxidation number is a quick way of determining

1. If a reaction is a redox (if the oxidation number changes, then it is.)
2. the substance oxidised (gain in oxidation number) and the substance reduced (loss in oxidation number)
3. Back to the three video examples: (no need to show the video if time runs out. The first two have been watched anyway.)

Video: <https://www.youtube.com/watch?v=afxwDTz_JTk>

Mg in HCl

I will use this as an example.

Step 1: Write a balanced equation.

Step 2: Figure any possible os change. If there is no os change, we do not have a redox reaction.

Step 3:If there is a change is os, we need to identify the oxising agent and reducing agent.

Definitions: A reducer is the substance that has an increase in its os in a redox reaxtion. A oxidiser is the substance that has a decrease in its os in a redox.

You can use the reaction between oxygen and magnesium as an example to remember this.

From the perspective of electron transfer, Mg loses two electrons..

Remind them of the limitation of the theory of electron transfer.

One example is the reaction between hydrogen and oxygen to form water…

Using os change is an easier way to determine redox.

1. **Summary**

In a redox reaction, an oxidiser is a substance that

* has a decrease in os.
* accepts electrons (or has more control of electrons)
* is reduced by the reducing agents.
* Oxidises another substance which is reducing agent.

In a redox, a reducer is a substance that

* has an increase in its os.
* Loses electrons (or in a covalent compound, has less control of electrons)
* Is oxidised by the oxidiser
* Reduces another substance (oxidiser)
1. **Sdutent activity**

video: <https://www.youtube.com/watch?v=I2t_Sg3A7MQ>

chlorine reacting with bromide and iodide ions

 chlorine reacting with iodide in solution.

<https://www.youtube.com/watch?v=UkL79QO2qGQ>

Copper and silver nitrate

Worksheet:

Q1-Q10, Q13, Q14.

Textbook

Page 332 Q2, Q4, Q6