Oxidation-Reduction

Activity 1: Two Truths and a Lie

Question Group 1

Question 1

Some chemical reactions involve oxidation but not reduction; and vice versa.
An element that is oxidized is one that loses electrons.
A reducing agent is a reactant containing the element that is oxidized.

Question 2

An element that is reduced is one that gains electrons.
In a redox reaction, reduction occurs in an early step and oxidation occurs in a later step.
An element that is oxidized experiences an increase in its oxidation number.

Question 3

An element that is oxidized experiences an increase in its oxidation number.
A reducing agent is an electron donor.
Some chemical reactions involve oxidation but not reduction; and vice versa.

Question Group 2

Question 4

An element that is oxidized experiences a decrease in its oxidation number.
It is not possible to have oxidation without also having reduction.
An element that is oxidized is one that loses electrons.

Question 5

It is not possible to have oxidation without also having reduction.
An element that is reduced experiences an increase in its oxidation number.
An element that is oxidized is one that loses electrons.

Question 6

An oxidizing agent is an electron acceptor.
An element that is reduced is one that gains electrons.
An element that is oxidized experiences a decrease in its oxidation number.

Question Group 3

Question 7

A substance that is oxidized is one that gains electrons.
An oxidizing agent is a reactant containing the element that is reduced.
An element that is oxidized is one that loses electrons.

Question 8

An oxidizing agent is a reactant containing the element that is reduced.
A substance that is reduced is one that loses electrons.
An element that is reduced is one that gains electrons.

Question 9

A reducing agent is a reactant containing the element that is oxidized.
An element that is oxidized is one that loses electrons.
A substance that is oxidized is one that gains electrons.

Activity 2: Redox Analysis 1
Question Group 4
Question 10
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Na + F_2 \rightarrow 2\ NaF$$

Question 11
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Na + Cl_2 \rightarrow 2\ NaCl$$

Question 12
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Na + Br_2 \rightarrow 2\ NaBr$$

Question 13
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Na + I_2 \rightarrow 2\ NaI$$

Question Group 5
Question 14
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Li + F_2 \rightarrow 2\ LiF$$

Question 15
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Li + Cl_2 \rightarrow 2\ LiCl$$

Question 16
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ K + Br_2 \rightarrow 2\ KBr$$

Question 17
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ K + I_2 \rightarrow 2\ KI$$

Question Group 6
Question 18
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$Cu + Cl_2 \rightarrow CuCl_2$$

Question 19
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Al + 3\ Br_2 \rightarrow 2\ AlBr_3$$

Question 20
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Al + 3\ Cl_2 \rightarrow 2\ AlCl_3$$

Question 21
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Fe + 3\ Cl_2 \rightarrow 2\ FeCl_3$$

Question Group 7
Question 22
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$4\ Na + O_2 \rightarrow 2\ Na_2O$$

Question 23
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$4\ K + O_2 \rightarrow 2\ K_2O$$

Question 24
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Mg + O_2 \rightarrow 2\ MgO$$

Question 25
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Ca + O_2 \rightarrow 2\ CaO$$

Question Group 8
Question 26
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Zn + O_2 \rightarrow 2\ ZnO$$

Question 27
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$4\ Ag + O_2 \rightarrow 2\ Ag_2O$$

Question 28
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$4\ Fe + 3\ O_2 \rightarrow 2\ Fe_2O_3$$

Question 29
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$2\ Cu_2O\ +\ O_2\ \rightarrow\ 4\ CuO$$

Question Group 9
Question 30
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$6\ Na\ +\ N_2\ \rightarrow\ 2\ Na_3N$$

Question 31
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$6\ Na\ +\ N_2\ \rightarrow\ 2\ Na_3N$$

Question 32
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$3\ Zn\ +\ N_2\ \rightarrow\ Zn_3N_2$$

Question 33
Identify the oxidation states of all elements in the reactants and products. Then identify the elements that are oxidized and reduced.

$$6\ Mg\ +\ P_4\ \rightarrow\ 2\ Mg_3P_2$$

Activity 3: Redox Analysis 2
Question Group 10
Question 34
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Ca + H_2 \rightarrow CaH_2$$

Question 35
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$O_2 + 2\ F_2 \rightarrow 2\ OF_2$$

Question 36
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$4\ B + 3\ O_2 \rightarrow 2\ B_2O_3$$

Question 37
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$N_2 + 3\ H_2 \rightarrow 2\ NH_3$$

Question Group11
Question 38
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Cu + 2\ AgNO_3 \rightarrow Cu(NO_3)_2 + 2\ Ag$$

Question 39
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$CuSO_4 + Mg \rightarrow MgSO_4 + Cu$$

Question 40
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$CuSO_4 + Fe \rightarrow FeSO_4 + Cu$$

Question 41
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Cu + H_2SO_4 \rightarrow CuSO_4 + H_2$$

Question Group 12
Question 42
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Cl_2 + 2\ NaBr \rightarrow 2\ NaCl + Br_2$$

Question 43
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Zn + PbCl_2 \rightarrow ZnCl_2 + Pb$$

Question 44
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$2\ Al + 6\ HCl \rightarrow 2\ AlCl_3 + 3\ H_2$$

Question 45
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Zn + 2\ HCl \rightarrow ZnCl_2 + H_2$$

Question Group 13
Question 46
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Ca + 2\,H_2O \rightarrow Ca(OH)_2 + H_2$$

Question 47
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$2\,Na + H_2O \rightarrow 2\,NaOH + H_2$$

Question 48
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Mg + 2\,H_2O \rightarrow Mg(OH)_2 + H_2$$

Question 49
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$2\,CO_2 + 2\,H_2O \rightarrow C_2H_4 + 3\,O_2$$

Question Group 14
Question 50-
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$2\,PbS + 3\,O_2 \rightarrow 2\,PbO + 2\,SO_2$$

Question 51
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$Fe_2O_3 + 3\,CO \rightarrow 2\,Fe + 3\,CO_2$$

Question 52
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$2\ Fe_2O_3\ +\ 3\ C\ \rightarrow\ 3\ CO_2\ +\ 4\ Fe$$

Question 53
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$CO_2\ +\ H_2\ \rightarrow\ CO\ +\ H_2O$$

Question Group 15
Question 54
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$MnO_2\ +\ 4\ HCl\ \rightarrow\ Cl_2\ +\ 2\ H_2O\ +\ MnCl_2$$

Question 55
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$2\ FeCl_3\ +\ 2\ KI\ \rightarrow\ 2\ FeCl_2\ +\ 2\ KCl\ +\ I_2$$

Question 56
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$2\ CuCl_2\ +\ 4\ KI\ \rightarrow\ 2\ CuI\ +\ 4\ KCl\ +\ I_2$$

Question 57
Use oxidation states to determine which elements are being oxidized and reduced. Then identify the oxidizing and reducing agents.

$$3\ CuS\ +\ 8\ HNO_3\ \rightarrow\ 3\ CuSO_4\ +\ 8\ NO\ +\ 4\ H_2O$$