

# 2022 SUBJECT WORKBOOK Grade 10



A joint initiative between the Western Cape Education Department and Stellenbosch University.



Western Cape Government



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#### **BROADCAST SESSIONS**

Session	Date	Time	Торіс
1	28 JULY 2022	15H00 – 16H00	CHEMICAL CHANGE





#### **INTRODUCTION AND TOPICS**

## TOPIC

**Chemical change** 

Term	Definition
	Define a physical change and give examples.
	Define a chemical change and give examples.
	Write word equations from chemical equations and vice versa
	Use (s), (aq), (I) and (g) to indicate phases.
	Write balanced chemical equations.
	Conservation of atoms and mass Law of constant composition.
	Interpret balanced equations in terms of conservation of atoms and mass





#### TAKE NOTE

#### Separation of particles in physical and chemical change

Define a physical change as a change in which:

- No new substances are formed o
- Energy changes are small in relation to chemical changes
- Mass, numbers of atoms and molecules as being conserved
- Describe the rearrangement of molecules during physical changes, e.g.
  - Molecules separate when water evaporates to form water vapour
  - When ice melts molecules become disorderly arranged due to breaking of intermolecular forces
- Define a chemical change as a change in which:
  - New chemical substances are formed
  - Energy changes are much larger than those of the physical change

Endothermic reaction: Energy is absorbed during the reaction Exothermic reaction: Energy is released during the reaction

o Mass and atoms are conserved, but the number of molecules is not

Describe examples of a chemical change that include the:

- Decomposition of hydrogen peroxide to form water and oxygen
- Synthesis reaction that occurs when hydrogen burns in oxygen to form water
- Heating of iron and sulphur
- Reaction of lead(II) nitrate and potassium iodide (in solid phase and/or as solutions)
- Titration of hydrochloric acid with sodium hydroxide to measure the change in temperature





#### TAKE NOTE

#### **Balanced chemical equations**

- Write and balance chemical equations. Use formulae with subscripts to represent phases, viz. (s), (ℓ), (g) and (aq).
- Interpret balanced reaction equations in terms of:
  - Conservation of atoms

Conservation of mass (use relative atomic masses)

#### <u> 1 Equation:</u>

Is this reaction decomposition or synthesis? .....

	reactants	Products
Number		
Names		
Number of atoms		

coefficients  $2H_2 + O_2 \rightarrow 2H_2O$ 

reactants

products





#### **TAKE NOTE**

A chemical formula represents:

- the elements that the compound is made of.
- the ratio in which the atoms of different elements have bonded to form a compound.

**Example 1**: water (H<sub>2</sub>O)

 $\rm H_2O$  is the formula for water – consists of 2 hydrogen atoms and 1 oxygen atom – it is expressed in the ratio 2:1



### **Example 2**: Carbon dioxide (CO<sub>2</sub>)

 $CO_2$  is the formula for carbon dioxide – consists of 1 carbon atom and 2 oxygen atoms – it is expressed in the ratio 1:2



**Example 3**: Ammonia (NH<sub>3</sub>)

 $\rm NH_3$  is the formula for ammonia – consists of 1 nitrogen atom and 3 hydrogen atoms – it is expressed in the ratio 1:3







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#### **TAKE NOTE**

### 2. Formulae

Write down the correct formulae for the following compounds.

	sodium natrium	potassium kalium	calcium kalsium	aluminium
chloride				
chloried				
oxide		r o		
oksied		K <sub>2</sub> O		
sulphide				
sulfied				
hydroxide hidroksied			Ca(OH)₂	
sulphate sulfaat				







## 3 Name the following compounds

HCI	H <sub>2</sub> O	
КОН	CH <sub>4</sub>	
Li <sub>2</sub> SO <sub>4</sub>	H <sub>2</sub> SO <sub>4</sub>	
MgO	Ca(NO <sub>3</sub> )	

NaCl	NaOH	
CaF <sub>2</sub>	NH <sub>3</sub>	
KNO <sub>3</sub>	MgCO <sub>3</sub>	
CO <sub>2</sub>	K <sub>2</sub> SO <sub>3</sub>	



