Grade 11
Term 3 Topics

These are the major term 3 topics as listed in the Grade 11 Physical Sciences ATP document for 2023/2024.

Remember: your school may do topics in a different order or in different terms.

Topic	Physics or Chemistry
Quantitative aspects of chemical change	Chemistry
Energy and change	Chemistry
Types of reactions	Chemistry
Ideal gases	Chemistry

QUANTITATIVE ASPECTS OF CHEMICAL CHANGE

Sub topics to study and practice

SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Define and calculate number of moles. Calculate mass, molar mass, number of particles, compounds, atoms	$n = \dfrac{m}{M}$ $n = \dfrac{N}{N_A}$	
State Avogadro's law and calculate moles and volume using molar gas at STP	$n = \dfrac{V}{V_m}$	
Define and calculate concentration	$C = \dfrac{n}{V}$	
Determine percentage composition of an element in a compound	% element = $\dfrac{\text{mass of element}}{\text{mass of compound}}$ × 100	
Define and determine the empirical formula from % composition.		
Do stoichiometric calculations including limiting reagents	* Determine limiting reagent * Calculate amount in excess etc.	
Determine theoretical yield and percentage yield	% yield = $\dfrac{\text{actual yield}}{\text{theoretical yield}}$ × 100	
Determine percentage purity	% purity = $\dfrac{\text{amount of pure substance}}{\text{total amount (impure)}}$ × 100	
Do stoichiometric calculations with explosions and reactions in airbags	* Remember to balance your equations * use mol ratios!	

ENERGY AND CHANGE

Sub topics to study and practice

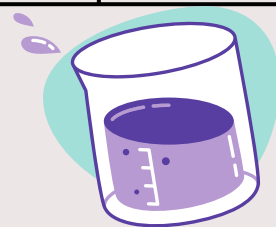| SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Define the following terms: – Heat of reaction (ΔH) – Activation energy - Activated complex		
Define an exothermic and an endothermic reaction		
Classify with reasons reactions as exothermic or endothermic		
State the sign of ΔH for exothermic and endothermic reactions		
Draw and interpret labelled graphs of potential energy vs course of reaction for exothermic and endothermic reactions		

TYPES OF REACTIONS: ACIDS AND BASES

Sub topics to study and practice

SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Write down the names and formulas of common acids and bases	Learn these off by heart! E.g. H_2SO_4 is sulfuric acid	
Define acids and bases according to the Arrhenius and Bronsted-Lowry theories		
Identify conjugate acid-base pairs for given compounds		
Describe the term amphiprotic or ampholyte and write equations to show how these substances can act as an acid or a base		
Write reaction equations for the dissolution of acids and bases in water		
Write the overall equations for the reactions of acids with metal hydroxides, metal oxides and metal carbonates		
Describe an acid-base indicator and know the colours of indicators in acids vs. bases		

IDEAL GASES

Sub topics to study and practice

Sub-topic	Formulae/things to know	☑
Describe the motion of individual molecules and understand the concepts: temperature of a gas and pressure exerted by a gas	Describe motion in terms of collisions, and speed. Understand average kinetic energy	
Describe an ideal gas and explain how a real gas differs from an ideal gas		
State the conditions under which a real gas approaches ideal gas behaviour		
Describe the relationship between volume and pressure for a fixed amount of gas at a constant temperature: Boyle's Law	- Understand practical experiments related to this - interpret given results - $p \propto \frac{1}{V}$ (inversely proportional)	

CO_2
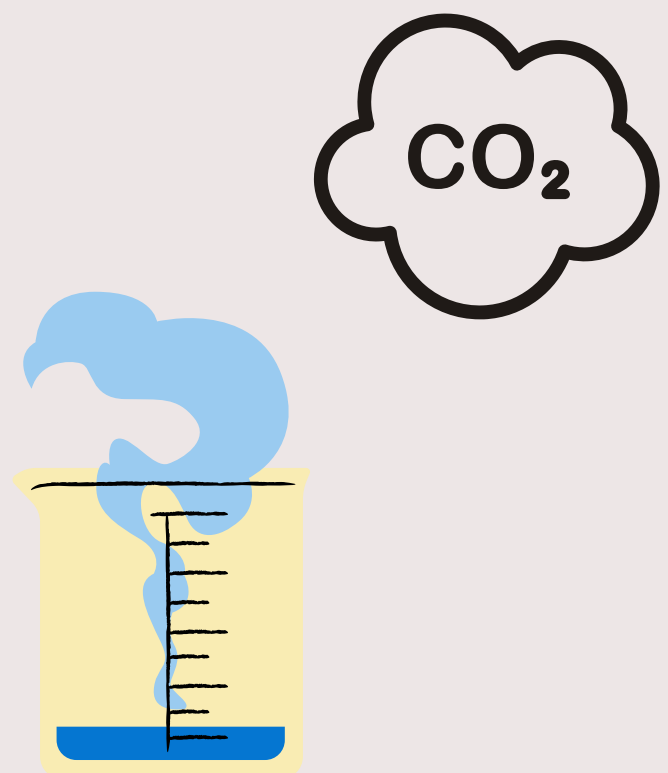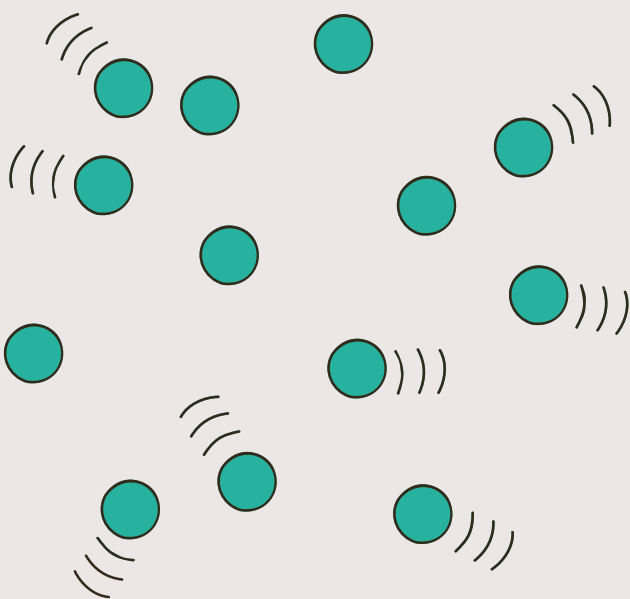
DATA SHEET FOR
TERM 3 CHEMISTRY GRADE 11

$$n = \frac{m}{M} \qquad n = \frac{N}{N_A} \qquad n = \frac{V}{V_m}$$

$$c = \frac{m}{MV} \quad \text{OR} \quad c = \frac{n}{V} \qquad \frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$$

$$pV = nRT$$

*% composition $= \dfrac{\text{mass of element}}{\text{total mass of compound}} \times 100$

*% yield $= \dfrac{\text{actual yield}}{\text{theoretical yield}} \times 100$

*NOT on formula sheet

Constants:

⭐ Avogadro's constant (N_A)
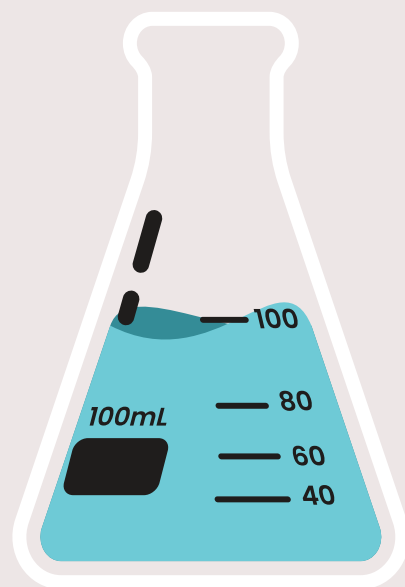 $6{,}02 \times 10^{23}$

⭐ Molar gas volume at STP (V_m)
   $22{,}4$

⭐ Molar gas constant (R) $8{,}31$

⭐ Standard temperature 273 K

⭐ Standard pressure $1{,}013 \times 10^{5}$ Pa

Summary of topics compiled by Miss Martins.

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Information obtained from the 2023/2024 annual teaching plans accessed at: https://www.education.gov.za/Curriculum/NationalCurriculumStatementsGradesR-12/2023ATPsFET.aspx