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Grade 10

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Term 1 Topics

These are the major term 1 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
Waves, sound and light: TRANSVERSE	Physics
Waves, sound and light: LONGITUDINAL and SOUND	Physics
Waves, sound and light: Electromagnetic radiation	Physics
Electrostatics	Physics
Electric circuits	Physics

Summary of topics compiled by Miss Martins

Qualified Physical Sciences and Maths teacher.

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

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CAPS IEB ALIGNED

WAVES, SOUND AND LIGHT: TRANSVERSE

Sub topics to study and practice

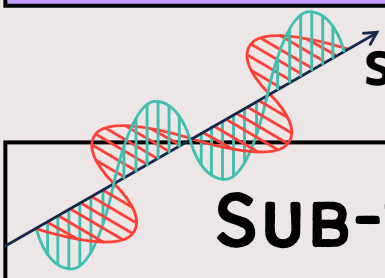
SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Define a pulse / transverse pulse		
Define & apply the principle of superposition: constructive vs. destructive interference		
Define a transverse wave and identify the wavelength, amplitude, period, crest, trough, points in and out of phase on a drawing		
Use the relationship between period and frequency to perform calculations	$f = \frac{1}{T}$ and $T = \frac{1}{f}$	
Define wave speed and use equation $v = f\lambda$ to calculate	$v = f\lambda$	
Draw and label a wave and perform calculations to determine period, wavelength, frequency, speed		

WAVES, SOUND AND LIGHT: LONGITUDINAL

Sub topics to study and practice

SUB-TOPIC	FORMULAE/THINGS TO KNOW	✓
Define a longitudinal wave and draw + label a diagram to represent		
Define and locate the wavelength & amplitude of a longitudinal wave		
Define a compression and a rarefaction		
Perform calculations relating to longitudinal waves	$v = f\lambda$	
understand that sound is a longitudinal wave and an echo is a reflection of a sound wave → perform calculations	use $\Delta x = s \times t$ s = speed t = time Δx = distance	
understand the relationship between wave speed and the medium it propagates (travels) through		
understand the following about sound: pitch (frequency), loudness (amplitude), quality of sound, noise		
Understand ultrasound and medical benefits and uses of ultrasound	→ sound > 20 kHz and up to 100 kHz	

WAVES, SOUND AND LIGHT: ELECTROMAGNETIC (EM waves)



Sub topics to study and practice

SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Explain/understand that an electromagnetic wave can act as a wave and particle	wave-particle duality	
Describe the source of EM waves and how it propagates (moves)		
Know that all EM radiation travels at the speed of light →	$c = 3 \times 10^8$ $m.s^{-1}$	
List properties of different types of EM radiation and give examples		
Arrange types of EM radiation in order of frequency or wavelength		
Use $c = f\lambda$ to calculate f or λ	$c = f\lambda$	
Define a photon and relate the energy of a photon to f and λ		
Calculate the energy of a photon using...	$E = hf$ or $E = \frac{hc}{\lambda}$	

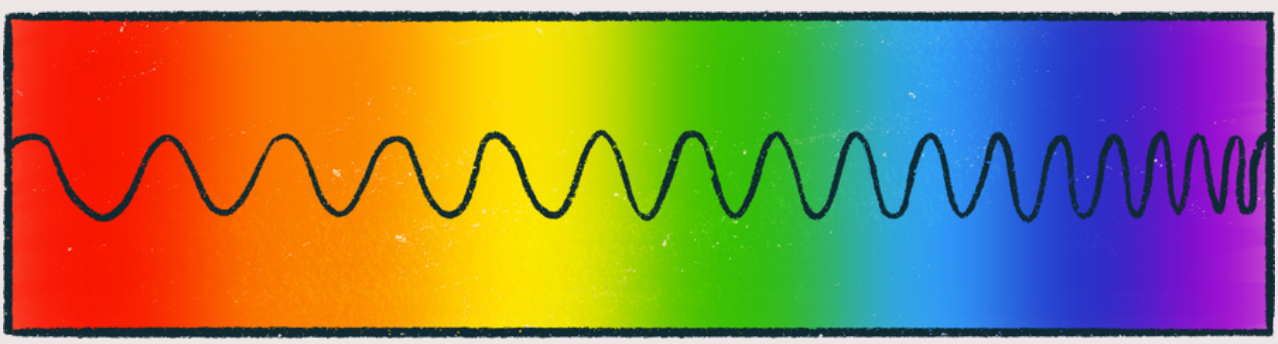
DATA SHEET FOR WAVES, SOUND AND LIGHT

$$V = f\lambda$$

$$T = \frac{1}{F} \quad \text{and} \quad f = \frac{1}{T}$$

$$c = f\lambda$$

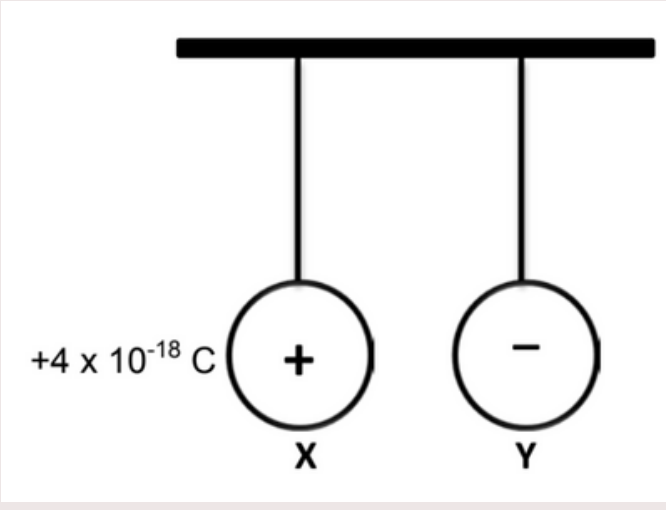
$$E = hf \quad \text{or} \quad E = \frac{hc}{\lambda}$$

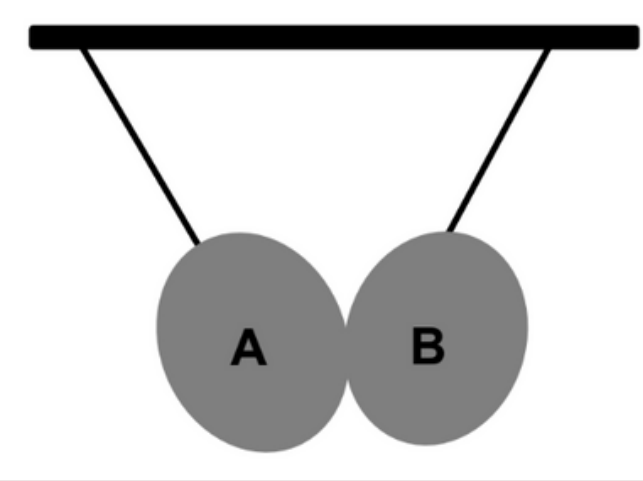


ELECTROSTATICS

Sub topics to study and practice

SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Understand how an object acquires a charge	- movement of electrons	
know that like charges repel and opposite (unlike) charges attract		
understand polarization		
State the principle of conservation of charge		
Apply the above for charges of identical sizes	$Q = \frac{Q_1 + Q_2}{2}$	
State and apply the principle of charge quantisation	$Q = nq$	





DATA SHEET FOR ELECTROSTATICS

$$n = \frac{Q}{e} \quad \text{or} \quad n = \frac{Q}{q_e}$$

$$Q = \frac{Q_1 + Q_2}{2}$$

Conversions (not on data sheet)

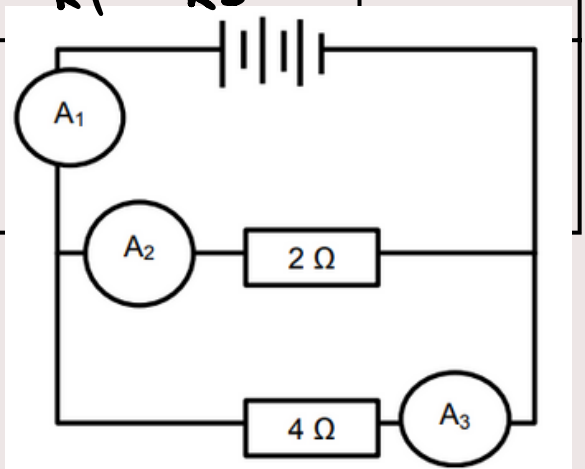
* study these! *

mC	milli	$\times 10^{-3}$
μC	micro	$\times 10^{-6}$
nC	nano	$\times 10^{-9}$
pC	pico	$\times 10^{-12}$

ELECTRIC CIRCUITS

Sub topics to study and practice

SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Define potential difference and emf & do calculations	$V = \frac{W}{Q}$ $V = I \times R$	
Define current strength and calculate current And define resistance	$I = \frac{Q}{\Delta t}$ $I = V/R$	
Draw circuit diagrams and understand current flow direction		
Explain why a battery in a circuit goes flat → energy transformations		
Describe resistors in series as potential difference dividers (current same)		
Describe resistors in parallel as current dividers (potential diff is same)		
Calculate total resistance of resistors in series and parallel	$R_s = R_1 + R_2 + \ldots$ $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \ldots$	
Perform circuit calculations (V, I and R) for series and parallel circuits		



DATA SHEET FOR ELECTRIC CIRCUITS

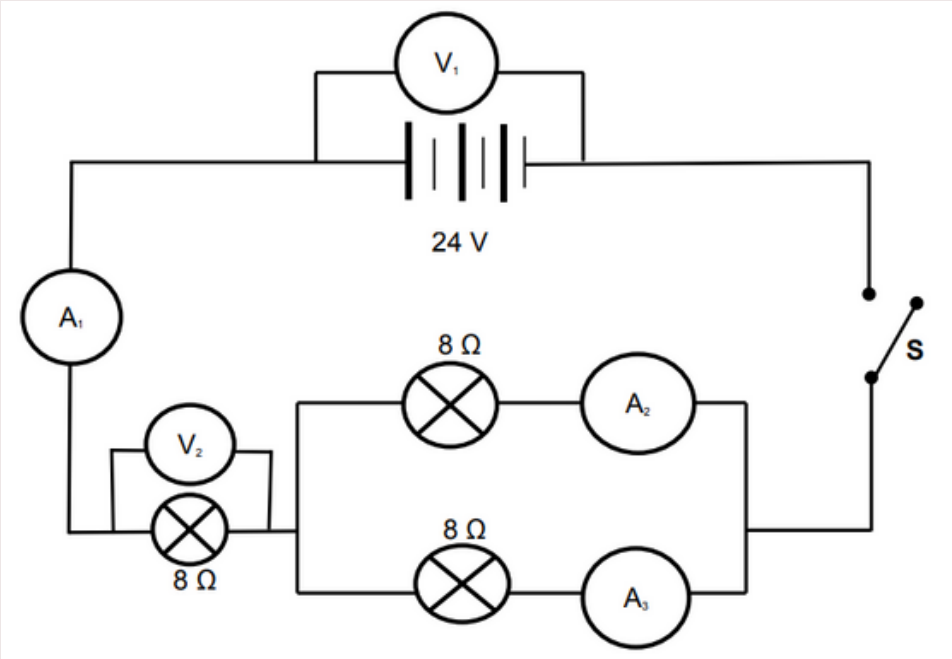
$$Q = I \Delta t$$

$$V = IR \quad \text{OR} \quad R = \frac{V}{I}$$

$$V = \frac{W}{q}$$

$$R_S = R_1 + R_2 + \dots$$

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$$



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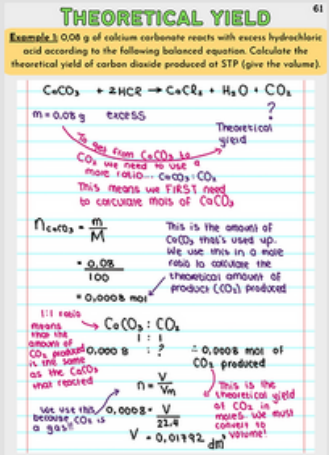
Sneak peek into the guide!



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