Grade 11

Term 1 Topics

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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
Vectors	Physics
Forces & free body diagrams	Physics
Newton's Laws	Physics
Electrostatics	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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VECTORS

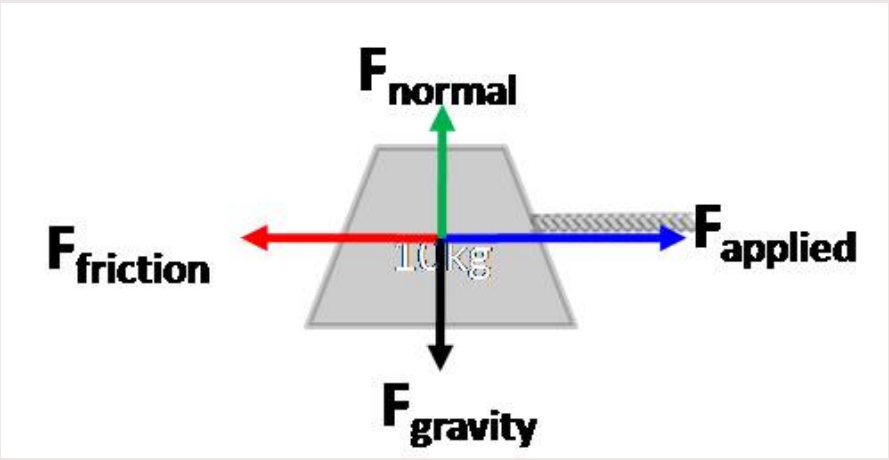
Sub topics to study and practice

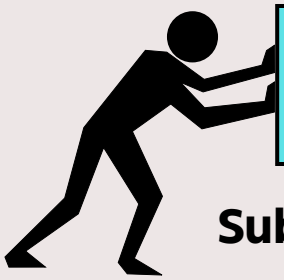
SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Define a vector and a resultant vector		
Determine the resultant of vectors in one dimension		
Determine the resultant of vectors in two dimensions -use Pythagoras (magnitude) and trig (for direction)		
Determine the resultant of vectors graphically (head to tail method) and by calculation		
Understand and work with closed vector diagrams and objects in equilibrium		
Resolve a vector into its horizontal and vertical components using trig and work out a resultant		

FORCES & FREE BODY DIAGRAMS

Sub topics to study and practice

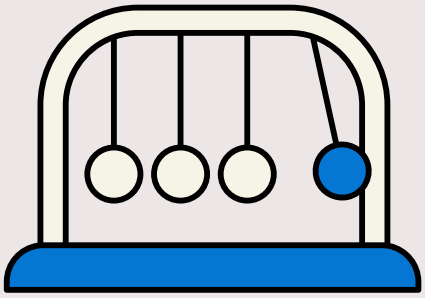
SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Define normal force, frictional force, weight		
calculate static friction and kinetic friction	$f_s^{max} = \mu_s N$ $f_k = \mu_k N$	
Know what affects (and does not affect) frictional force		
Resolve forces acting at an angle into components e.g. $F_{g\parallel}$ and $F_{g\perp}$		
Draw force and free-body diagrams		





NEWTON'S LAWS

Sub topics to study and practice



SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
State Newtons first law of motion and understand inertia and importance of seatbelts	$F_{net} = 0$	
State newtons second law of motion	$F_{net} = ma$	
Draw force and free body diagrams		
Apply Newton's second law for a single object moving with / without friction on a flat surface / incline / vertical plane		
Apply Newton's second law for two-body systems (objects connected) • both on flat horizontal surface; one on a surface, one hanging; both on inclined plane; both hanging		
State Newton's Third law of motion and identify Newton III force pairs		
State Newton's Law of Universal gravitation and calculate force exerted by one body on another	$F = \frac{GM_1M_2}{d^2}$	
Calculate acceleration due to gravity	$g = \frac{GM}{r^2}$	

DATA SHEET FOR

FORCES & NEWTON'S LAWS

$$F_{net} = ma$$

$$f_s^{max} = \mu_s N$$

$$f_k = \mu_k N$$

$$w = mg$$

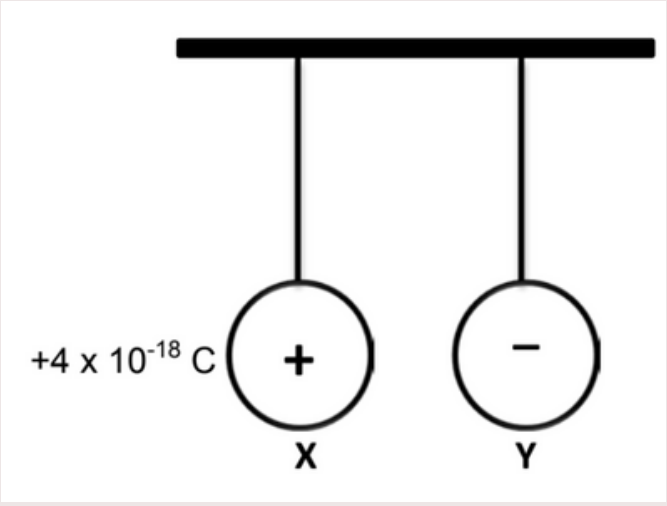
$$F = \frac{G m_1 m_2}{d^2} \quad \text{OR} \quad F = \frac{G m_1 m_2}{r^2}$$

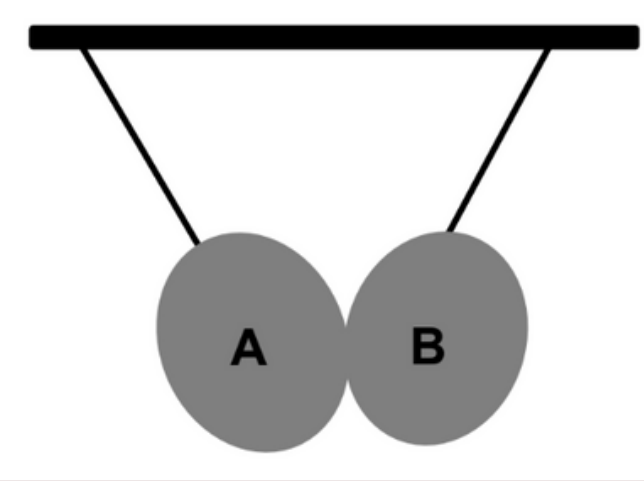
$$g = \frac{GM}{d^2} \quad \text{OR} \quad g = \frac{GM}{r^2}$$

ELECTROSTATICS

Sub topics to study and practice

SUB-TOPIC	FORMULAE/THINGS TO KNOW	☑
Revise electrostatics from grade 10 including conservation of charge and quantisation of charge	$Q = \frac{Q_1 + Q_2}{2}$ $n = Q/q_e$	
State coulomb's law and solve problems using the law (1D and 2D)	$F = \frac{kQ_1Q_2}{r^2}$	
Define an electric field and electric field at a point		
Draw electric field patterns		
Use $E = F/Q$ to determine the force exerted on a charged particle within an electric field	$E = F/Q$	
Calculate the electric field at a point due to a number of point charges	$E = \frac{kQ}{r^2}$	





DATA SHEET FOR ELECTROSTATICS

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

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

$q_e = -1,6 \times 10^{-19}$

$$F = \frac{k Q_1 Q_2}{r^2}$$

$$E = \frac{k Q}{r^2}$$

$$E = \frac{F}{q}$$

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