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SBA GUIDELINES
Practical work:

- **Learners should do TWO experiments (ONE Chemistry, ONE Physics) for SBA.**
- **Term 1:** Newton's 2nd law of motion (F vs a) **Term 3:** Boyle's law **OR** Titration

2024 CUSTOMISED KZN Recovery ATP: Grade 11 – Term 1: PHYSICAL SCIENCES							
Week Date Hours available	**Knowledge Area (Topic Duration)**	**Concepts for week**	**Page in CAPS doc**	**Date completed**	**SMT Member Signature**	**% Curriculum coverage**	
						Per term	**Annual**
Week 1 17 – 19 January (3 days)	**Mechanics: Vectors in two dimensions (2hrs)**	**REVISION (Gr 10): Vectors and scalars. Representation of vectors** • Define a resultant. • Determine the resultant (R) of two vectors by calculation for a maximum of four vectors in 1-dimension. (Revision from Grade 10) • Sketch the vertical vector (R_y) and the horizontal vector(R_x) of a 2-dimensional vector on a Cartesian plane. • Calculate the magnitude of the resultant of two vectors acting at right angles to each other using the theorem of Pythagoras. • Determine the direction of the resultant using simple trigonometric ratios.	**61**			**6%**	**2%**
Week 2 22 – 26 January (5 days)	**Mechanics: Vectors in two dimensions (4hrs)**	• Resolve a vector R into its horizontal (R_x) and vertical (R_y) components using $R_x = R\cos\theta$ and $R_y = R\sin\theta$ where θ is the angle between R and the x-axis • Determine the resultant (R) of two vectors graphically using either the tail-to-head or tail-to-tail method (parallelogram method) as well as by calculation (component method) for a maximum of four vectors in 2-dimensions. • Determine the resultant of vectors (maximum four) on a Cartesian plane, using the component method. • Explain the meaning of a closed vector diagram. **Practical (Informal)**: **Determine the resultant of three co-planar, non-linear force vectors**	**61**			**18%**	**6%**
Week 3 29 Jan – 02 Feb(5 days)	**Mechanics: Vectors in two dimensions (2hrs)** **Newton's Laws (2hrs)**	• State and apply the triangle law for three forces in equilibrium. **Newton's Laws** • Define normal force, N. • Define frictional force, f. • Know that a frictional force: ○ Is proportional to the normal force. ○ Is independent of the area of the surfaces that are in contact with each other. • Define static frictional force, f_s • Solve problems using $f_s = \mu_s N$ and $f_s^{max} = \mu_s^{max} N$ • Define the kinetic frictional force, f_k • Solve problems using $f_k = \mu_k N$	**61**			**30%**	**9%**
Week 4 05 – 09 February (5 days)	**Mechanics: Newton's laws (4hrs)**	**Frictional forces** • Draw force diagrams and free-body diagrams for objects that are in equilibrium or accelerating horizontally, vertically or on an inclined plane • Resolve a two-dimensional force, e.g. the weight of an object on an inclined plane, into its parallel ($W_{//}$) and perpendicular ($W_{\perp}$) components. • Determine the resultant/net force of two or more forces. • State Newton's first law of motion. • Define inertia and state that the mass of an object is a quantitative measure of its inertia. • Discuss why it is important to wear seatbelts using Newton's first law of motion. • State Newton's second law of motion. In symbols: $F_{net} = ma$ • State Newton's third law of motion. • Identify Newton III force pairs (action-reaction pairs) and list the properties of the force pairs (action-reaction pairs).	**62 – 63**			**42%**	**13%**
Week 5 12 – 16 February (5 days)	**Mechanics: Newton's laws (4hrs)**	• Apply Newton's laws of motion to a variety ofequilibrium and non-equilibrium problems including: ○ A single object: - Moving in a horizontal plane with or without friction. - Moving on an inclined plane with or without friction. - Moving in the vertical plane (lifts, rockets, etc.) ○ Two-body systems (joined by light inextensible string): - Both on a horizontal plane with or without friction. - One in a horizontal plane with or without friction, and a second hanging vertically from astring over a frictionless pulley. - Both on an inclined plane with or without friction. - Both hanging vertically from a string over a frictionless pulley **FORMAL PRACTICAL (SBA)**: **Newton's 2nd law of motion**	**64 – 65**			**54%**	**16%**

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2024 CUSTOMISED KZN Recovery ATP: Grade 11 – Term 1: PHYSICAL SCIENCES							
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						Per term	**Annual**
Week 6 19 – 23 February (5 days)	**Mechanics: Newton's law of universal gravitation (4hrs)**	• State Newton's law of universal gravitation. • Solve problems using **$F = \frac{Gm_1m_2}{r^2}$** • Calculate acceleration due to gravity on Earth using **$g = \frac{GM_E}{R_E^2}$** and on another planet using **$g = \frac{GM_P}{R_P^2}$** where M_P is the mass of the planet and R_p is the radius of the planet. • Explain the difference between the terms weight and mass. • Calculate weight using the w = mg. • Calculate the weight of an object on other planets withdifferent values of gravitational acceleration. • Explain the term weightlessness **INFORMAL TEST (NEWTON'S LAWS)**	66			**66%**	**20%**
Week 7 26 Feb – 1 March (5 days)	**ELECTRICITY & MAGNETISM: Electrostatics (4hrs)**	**REVISION (Gr 10): Positive and negative charges. Electrostatic forces. Conservation of charge. Vectors and scalars** • State Coulomb's law in words and in symbols. • Solve problems using: **$F = \frac{kQ_1Q_2}{r^2}$** ○ for charges in one dimension(1D) – restrict to three charges. ○ for charges in two dimensions (2D) – for three charges in a right-angled formation (limit to calculation of net forces acting on the charge at the right- angle of the triangle').	84			**90%**	**27%**
Week 8 04 – 08 March (5 days)	**ELECTRICITY & MAGNETISM: Electrostatics (4 hrs)**	• Describe an electric field as a region in space in which anelectric charge experiences a force. • Draw electric field patterns for the following configurations: ○ A single point charge ○ Two point charges (one negative, one positive, both positive and both negative) ○ A charged sphere **k (**Restrict to charges identical inmagnitude.) • Define the electric field at a point. ($E = \frac{F}{q}$) Solve problems using the equation $E = \frac{kQ}{r^2}$ • Calculate the electric field at a point due to a number of point charges, using the equation $E = \frac{kQ}{r^2}$ Determine the contribution to the field due to each charge. Restrict to three charges in a straight line.	**85**			**100**	**30%**
Week 9 11 – 15 March (5 days)		**REVISION/CONTROLLED TEST – ONE PAPER (100 marks)** **<u>Mechanics:</u>** • Vectors in two dimensions, Different kinds of forces, Force diagrams, Free-body diagrams, • Newton`s First, Second andThird Laws. • Newton's Law of Universal Gravitation. **<u>Electricity and Magnetism</u>: Electrostatics** • Electric charge and charge transfer (grade 10) • Coulomb's Law, • Electric Fields.					
Week 10 18 – 20 March (3hrs)		CONTROLLED TEST CONTINUED					

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maximum four resistors excluding internal resistance **2024 CUSTOMISED KZN Recovery ATP: Grade 11 – Term 2: PHYSICAL SCIENCES**							
Week	**Knowledge Area (Topic Duration)**	**Concepts for week**	**Page in CAPS doc**	**Date completed**	**SMT Member Signature**	**% Curriculum coverage**	
						Per term	**Annual**
Week 1 03 – 05 April (3 days)	**Discussion (3 hrs)**	• Discussion and review of March Controlled Test				**0%**	**30%**
Week 2 08 – 12 April (5 days)	**ELECTRICITY & MAGNETISM: Electromagnetism (4 hrs)**	**REVISION (Gr 10):** ➢ **Positive & negative charges** ➢ **Electrostatics forces** ➢ **Electric fields** ➢ **Vectors & scalars** • Magnetic field near a current carrying wire • Use the Right Hand Rule to determine the direction of the magnetic field associated with: (i) A straight current carrying wire (ii) A current carrying loop (single) of wire (iii) A solenoid • Draw the magnetic field lines around: (i) A straight current carrying wire (ii) A current carrying loop (single) of wire. (iii) A solenoid • Discuss qualitatively the environmental impact of overhead electrical cables. • Define: The Magnetic flux, (Φ = BAcosΦ, where for a loop of area A in the presence of a uniform magnetic field B, the magnetic flux (Φ) passing through the loop, Φ = BAcosθ, where θ is the angle between the magnetic field B and the normal to the loop of area, A) The induced current flows in a direction so as to set up a magnetic field to oppose the change in magnetic flux. • State Faraday's Law of electromagnetic induction. • Calculate: Induced emf (ε) and induced current (I), for situations involving a changing magnetic field, use the equation for Faraday's Law, where Φ = BA cos θ is the magnetic flux and $\varepsilon = -N\frac{\Delta\Phi}{\Delta t}$ is the induced emf.	**86**			**12%**	**34%**
Week 3 15 – 19 April (5 days)	**ELECTRICITY & MAGNETISM: Electromagnetism (4hrs)**	• Use words and pictures to describe what happens when a bar magnet is pushed into or pulled out of a solenoid connected to a galvanometer. • Use the Right Hand Rule to determine the direction of the induced current in a solenoid when the north or south pole of a magnet is inserted or pulled out. • More calculations – Faraday's Law. **INFORMAL TEST**	**87**			**18%**	**35%**
Week 4 22 – 26 April (5 days)	**ELECTRICITY & MAGNETISM: Electric circuits (4hrs)**	**REVISION (Gr 10): Electric circuits: Current, Potential difference, Resistance.** • State Ohm's law in words. • Interpret data/graphs on the relationship between current, potential difference and resistance at constant temperature. • State the difference between Ohmic and non-Ohmic conductors and give an example of each. • Solve problems involving current, voltage and resistance for circuits containing arrangements of resistors in series and in parallel (maximum four resistors excluding internal resistance) **Practical (Informal):** Ohm's law				**30%**	**39%**
Week 5 29 Apr – 03 May (5 days)	**ELECTRICITY & MAGNETISM: Electric circuits (4hrs)**	• Define power. • Solve problems using $P = \frac{W}{\Delta t}$ • Recall that W = VQ and by substituting Q = IΔt and V = IR, the following energy transfer equations are obtained: $W = VI\Delta t \qquad W = I^2R\Delta t \qquad W = \frac{V^2}{R}\Delta t$ • Deduce, by substituting $P = \frac{W}{\Delta t}$ into above equations, the following power equations are obtained: $P = VI \qquad P = I^2R \qquad P = \frac{V^2}{R}$ • Solve problems using the above energy transfer and power equations for components in a circuit.	**89**			**42%**	**43%**
Week 6 06 – 10 May (5 days)	**ELECTRICITY & MAGNETISM: Electric circuits (4hrs)**	• Deduce that the kilowatt-hour (kWh) refers to the use of 1 kilowatt of electricity for 1 hour. • Know that 1 kWh is an amount of electrical energy known as one unit of electricity. • Calculate the cost of electricity usage given the power specifications of the appliances used the duration and the cost of 1 kWh. **INFORMAL TEST** • Explain the term internal resistance. • Solve circuit problems using $\varepsilon = IR_{ext} + Ir$ or $\varepsilon = V_{load} + V_{lost}$ • Solve problems, with internal resistance, for circuits containing arrangements of resistors in series and in parallel (maximum four resistors).	**89**			**54%**	**46%**

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						Per term	Annual
Week 7 **13 – 17 May** **(5 days)**	**MATTER & MATERIAL: Atomic combinations (4hrs)**	**REVISION (Gr 10): Chemical bonding, Electron configuration, Writing of formulae** • Define a chemical bond. • Draw Lewis dot diagrams of elements. • Determine the number of valence electrons in an atom. • Explain, in terms of electrostatic forces and in terms of energy, why: ○ Two H atoms form an H_2 molecule ○ He does not form He_2 • Interpret the graph of potential energy versus the distance between nuclei for two approaching hydrogen atoms. • Define: a covalent bond, a molecule Draw Lewis diagrams for simple molecules, e.g. H_2, F_2, H_2O, NH_3, CH_4, HF, OF_2, HOCl and molecules with multiple bonds, e.g. N_2, O_2 and HCN. • Discuss molecular shapes of H_2 (linear) H_2O (angular), NH_3 (pyramidal), CO_2 (linear), CH_4 (tetrahedral). • Describe rules for bond formation. • Define a bonding pair and a lone pair. • Describe the formation of the dative covalent bond	**67 – 68**			**66%**	**50%**
Week 8 **20 – 24 May (5 days)**	**MATTER & MATERIAL: Atomic combinations (4hrs)**	• Define electronegativity. • Describe, with examples, a non-polar covalent bond. • Describe, with examples, a polar covalent bond. • Show polarity of bonds using partial charges, e.g. $H^{\delta+}Cl^{\delta-}$. • Compare the polarity of chemical bonds using a table of electronegativities. • Explain that the character of a bond varies from non-polar covalent ($\Delta EN = 0$) to polar covalent ($0 < \Delta EN \leq 2,1$) to ionic ($\Delta EN > 2,1$). • Use difference in electronegativity and molecular shape to explain that polar bonds do not always lead to polar molecules. • Define bond energy and bond length. • Explain the relationship between bond energy and bond length. • Explain the relationship between the strength of a chemical bond and bond length, size of bonded atoms and number of bonds. **INFORMAL TEST**	**70 – 71**			**78%**	**54%**
Week 9 **27 – 31 May (5 days)**	**MATTER & MATERIAL: Intermolecular forces (4 hrs)**	**REVISION (GR 10): Chemical bonding, Writing of formulae, Valency, Periodic table.** • Describe the difference between intermolecular forces and interatomic forces (intramolecular forces) using a diagram of a group of small molecules & in words. • Name and explain the different intermolecular forces (Van der Waals forces): ○ Mutually induced dipole forces or London forces: ○ Dipole-dipole forces ○ Dipole induced dipole forces ○ Hydrogen bonding ○ Ion-dipole forces: Forces between ions and polar Molecules. • State the relationship between intermolecular forces and molecular mass. • Explain the effect of intermolecular forces on boiling point, melting point, vapour pressure & solubility.	**72** **73**			**90%** **100%**	**57%** **60%**
Week 10 **03 – 07 June** **(5 days)**	**JUNE/MID YEAR EXAM**	• Consolidation of term 2 work **PAPER 1(100 marks)** • Vectors in two dimensions • Newton's laws • Electrostatics • Electromagnetism • Electric circuits					
Week 11 **10 – 14 June** **(5 days)**	**JUNE/MID YEAR EXAM**	**PAPER 2 (100 marks)** • Chemical bonding • Lewis diagrams and electron configuration • Writing of formulae • Molecular shapes • Electronegativity • Intermolecular forces					

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2024 CUSTOMISED KZN Recovery ATP: Grade 11 – Term 3: PHYSICAL SCIENCES							
Week	**Knowledge Area(Topic Duration)**	**Concepts for week**	**Page in CAPS doc**	**Date completed**	**SMT Member Signature**	**%Curriculum Coverage**	
						Per term	**Annual**
Week 1 09 – 12 July (3/4 hours)	**JUNE CONTROL TEST: Discussion (3 hrs)**	• Discussion and corrections of the June Examination. • **INFORMAL TEST (REMEDIAL)**					
Week 2 15 – 19 July (4hrs)	**CHEMICAL CHANGE: Quantitative aspects ofchemical change (4hrs)**	**REVISION (Gr 10): Mole concept, Molar mass, Molar vol, Concentration, Writing of formulae and balanced eqns.** • Describe the mole as the SI unit for amount of substance. • Define one mole. • Describe Avogadro's number, N_A, as the number of particles (atoms, molecules, formula-units) present in one mole. • Define molar mass. • Calculate the molar mass of a substance given its formula. • State Avogadro's Law. • Know: molar gas vol, V_m, at STP is 22,4 $dm^3 \cdot mol^{-1}$. • Do calculations using $n = \frac{m}{M}$; $n = \frac{V}{V_m}$; $n = \frac{\text{no of particles}}{N_A}$	**50 – 53 (Gr 10 work)**			**11%**	**64%**
Week 3 22-26 July (5 days)	**CHEMICAL CHANGE: Quantitative aspects ofchemical change (4hrs)**	• Interpret balanced equations in terms of volume relationships for gases. • Define concentration. • Calculate concentration, in $mol \cdot dm^{-3}$, using $c = \frac{n}{V}$ • Determine percentage composition of a compound. • Determine the empirical formulae and molecular formulae of compounds. • Do stoichiometric calculations including limitingreagents.	**82 – 83**			**22%**	**67%**
Week 4 29 July – 02 August (5 days)	**CHEMICAL CHANGE: Quantitative aspects ofchemical change (4 hrs)**	• Determine the percentage yield in a reaction. • Determine the percentage $CaCO_3$ in an impure sample of seashells (purity or percent composition). • Stoichiometric calculations with explosions as reactions e.g. $2NH_4NO_3 \rightarrow 2N_2(g) + 4H_2O(g) + O_2(g)$ $2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$ • Stoichiometric calculations using reaction in airbags (sodium azide): $2NaN_3(s) \rightarrow 2Na(s) + 3N_2(g)$ **INFORMAL TEST**	**82 – 83**			**34%**	**71%**
Week 5 05 – 08 August (4 days)	**CHEMICAL CHANGE: Energy and chemicalchange (4hrs)**	**REVISION (Gr10): Chemical reactions** • Define heat of reaction (ΔH). • Define an exothermic reaction. • Define and endothermic reaction. • Classify, with reason, reactions as exothermic or endothermic. • State the sign of ΔH for exothermic and endothermic reactions. • Define activation energy. • Define an activated complex. • Draw or interpret fully labeled sketch graphs (potential energy versus course of reaction graphs) of catalysed and uncatalysed endothermic andexothermic reactions.	**83**			**42%**	**74%**
Week 6 12 – 16 August (5 days)	**CHEMICAL CHANGE: Types of reaction (Acid-Base Reactions) (4hrs)**	• Write names and formulae of common acids: hydrochloric acid, nitric acid, sulphuric acid and ethanoic acid (acetic acid). • Write names and formulae of common bases: ammonia, sodium carbonate (washing soda), sodium hydrogen carbonate, sodium hydroxide (caustic soda) and potassium hydroxide. • Define acids and bases according to the Arrhenius &Bronsted-Lowrey theories. • Identify conjugate acid-base pairs. • Describe the term amphiprotic or ampholyte. • Write equations to show how an amphiprotic substance can act as acid or base. • Write reaction equations for the dissolution of acids and bases in water. • Distinguish between strong and weak and concentrated and dilute acids & bases with examples. • Explain the pH scale and calculate pH values of strong and weak acids and bases. • Write the overall equations for the reactions of acids with metal hydroxides, metal oxides and metal carbonates.	**90 – 92**			**65%**	**81%**

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Week 7 **19 - 23 August** (5 days)	**CHEMICAL CHANGE: Acids and bases (4hrs)**	**REVISION(Gr 10): Writing of formulae and balanced equations** • Describe an acid- base indicator as a weak acid, or a weak base, whose colour changes as the H^+ ion or the OH^- ion concentration in a solution change. • Know the colours of litmus, methyl orange, Phenolphthalein and bromothymol blue in acids and in bases. • Volumetric analysis(Neutralisation Reactions) • Stoichiometric calculations using acid-base reactions. • Identify the acid and the base needed to prepare a given salt and write an equation for the reaction. • Write down neutralisation reactions of common laboratory acids and bases. **Practical (Informal): Preparation of a standard solution** **Practical FORMAL (SBA): Titration** **INFORMAL TEST**	**125 - 126**			**77%**	**85%**
Week 8 **26 – 30 August** **(5 days)**	**MATTER AND MATERIAL: Ideal gases and thermal properties (4hrs)**	• Describe the motion of individual molecules i.e. - collisions with each other and the walls ofthe container - molecules in a sample of gas move atdifferent speeds • Explain the idea of *average speeds* in the context of molecules of a gas. • Describe an ideal gas in terms of the motion of molecules. • Explain how a real gas differs from an ideal gas. State the conditions under which a real gasapproaches ideal gas behaviour.	**80 – 81**			**87.8**	**96.1**
Week 9 **02 – 06 Sept** **(5days)**	**MATTER AND MATERIAL: Ideal gases and thermal properties(4 hrs)**	• Describe the relationship between volume and pressure for a fixed amount of gas at constant temperature (Boyle's law): o Practically o By interpreting table of results o Using graphs o Using symbols ('$\propto$') and the words inversely proportional. o Writing a relevant equation. • Explain the temperature of a gas in terms of the average kinetic energy of the molecules of the gas. • Explain the pressure exerted by a gas in terms of the collision of the molecules with the walls of the container. **Practical FORMAL(SBA): BOYLE'S LAW**	**80 - 89**			**100%**	**92%**
Week 10 **09 – 13 Sept** **(5 days)**	**REVISION / CONTROLLEDTEST**	**Revision / Controlled Test** • Quantitative aspects of chemical change • Energy and chemical change • Acids and bases • Ideal gases and thermal properties					
Week 11 **16 – 20 Sept** **(5days)**	**CONTROLLEDTEST**	CONTROLLED TEST CONTINUED					

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2024 CUSTOMISED KZN Recovery ATP: Grade 11 – Term 4: PHYSICAL SCIENCES							
Week	**Knowledge Area (Topic Duration)**	**Concepts for week**	**Page in CAPS doc**	**Date completed**	**SMT Member Signature**	**%Curriculum Coverage**	
						Per term	**Annual**
Week 1 **01 – 04 Oct** **(4 days)**	**SEPTEMBER CONTROL TEST: Discussion (2hrs)** **CHEMICAL CHANGE: Types of reaction (1hr)**	• Discussion of the control test • **INFORMAL TEST (REMEDIAL WORK)**					
Week 2 **07 – 11 Oct** **(5 days)**	**CHEMICAL CHANGE: Types of reaction (4hrs)**	**Redox reactions** • Explain the meaning of *oxidation number*. • Assign oxidation numbers to atoms in various ions and molecules, e.g. H_2O, CH_4, CO_2, H_2O_2, and HOCl by using oxidation number guidelines or rules. • Describe a redox (oxidation-reduction) reaction as involving an electron transfer. • Describe a redox (oxidation-reduction) reaction as always involving changes in oxidation numbers.	**92** **92 – 93**			**11%** **55%**	**93%** **96%**
Week 3 **14 – 18 Oct** **(4hrs)**	**CHEMICAL CHANGE: Types of reaction (4 hrs)**	**Redox reactions** • Identify a redox reaction and apply the correct terminology to describe all the processes i.e. oxidation, reduction, reducing agent, oxidizing agent. • Balance redox reactions by using half-reactions from the Table of Standard Reduction Potentials	**93 – 94**			**100%**	**100%**
Week 4 - 6 **21 Oct – 15 Nov** **(20 days)**	**CONSOLIDATION AND REVISION (16hrs)**	• All topics					
Week 7- 9 **18 Nov – 11 Dec** (18 days)	**FINAL EXAMINATION** **P1: 3 hrs** **P2: 3 hrs**	**Physics Paper 1** **(150 marks)** • Vectors in two dimensions • Newton's laws • Electrostatics • Electromagnetism • Electric circuits **Chemistry Paper 2** **(150 marks)** • Atomic combinations • Intermolecular forces • Ideal gases and thermal properties • Quantitative aspects of chemical change • Energy and chemical change • Acid – base reactions • Redox reactions					