

Physical Science/ Fisiesewetenskappe



Gr

Details/ PSC – FWT (2021)

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First term / Eerste kwartaal

Inleiding tot Fisiese Wetenskappe / Introduction to Physical Sciences

1. Units of the SI system / Eenhede van die SI sisteem
Scientific notation / Wetenskaplike notasie.
2. Laboratory rules. Be a responsible scientist / Laboratoriumreëls. Wees 'n verantwoordelike wetenskaplike.
3. The Scientific method / Die Wetenskaplike metode.
4. Types of graphs / Soorte grafieke

A Electricity / Elektrisiteit

1. The effect of charged objects on one another / Die effek van gelaaide voorwerpe op mekaar
2. Charging an electroscope / Laai van 'n elektroskoop
3. Effects of static electricity illustrated by means of the van de Graaff generator / Effek van statiese elektrisiteit geïllustreer met die van de Graaff ontwikkelaar
4. The magnetic field of a bar magnet / Die magneetveld van 'n staafmagneet
5. The electromagnet / Die elektromagneet
6. Circuits – series and parallel / Stroombane – serie en parallel
7. Resistance: $R = \frac{V}{I}$ / Weerstand : $R= V/I$
8. Calculations / Berekenings

Second term / Tweede kwartaal

B 1.Matter and Materials / Materie en materiale

- 1.1 Elements and compounds / Elemente en verbindings
- 1.2 The periodic table/ Die periodieketabel
- 1.3 Atoms and molecules / Atome en molekules
- 1.4 Building molecules of different compounds / Bou molekules van verskillende verbindings
- 1.5 Properties of elements differ from properties of compounds / Eienskappe van elemente verskil van eienskappe van verbindings
- 1.6 Separating methods for mixtures and compounds / Skeidingsmetodes

vir mengsels en verbindings

2. The particle theory / Die deeltjieteorie

- 2.1. Diffusion of particles in a liquid / Diffusie van deeltjies in 'n vloeistof
- 2.2. What happens when substances change their state / Wat gebeur as stowwe van fase verander
- 2.3. Melting points and boiling points of different substances / Smeltpunte en kookpunte van verskillende stowwe

C Energy and change /Energie en verandering

1. Energy transfer and systems: / Energieoordrag en sisteme:
Different forms of energy / Verskillende vorms van energie
Energy transfer in systems / Energieoordrag in sisteme
Energy storage in systems / Stoor van energie in sisteme
Energy losses from systems / Energieverlies in sisteme
Converting energy efficiently / Effektiewe energieomskakeling
2. Energy and development in South Africa: / Energie en ontwikkeling in SA
Electricity generation / Opwekking van elektrisiteit
Impact of use of electricity / Die impak van elektrisiteitsverbruik
Alternative sources of electricity / Alternatiewe bronne van elektrisiteit
3. Renewable fuels and non-renewable fuels / Hernubare- en nie-hernubare brandstowwe.
4. Global warming / Aardverwarming.

Third term / Derde kwartaal

D Digtheid / Density

Digtheid van vaste stowwe. / Density of solids
Die digtheid van verskillende vloeistowwe. / Density of different liquids
Meting en berekening van digtheid. / Measuring and calculating density
Digtheid van gasse en vakuum. / Density of gases and vacuum

E Gases / Gasse

1. Oxygen / Suurstof

- 1.1 The occurrence of oxygen / Die voorkoms van suurstof
- 1.2 The characteristics of oxygen / Die eienskappe van suurstof
- 1.3 Reactions of oxygen with metals and non-metals / Reaksies van suurstof met metale en nie-metale
- 1.4 The uses of oxygen / Die gebruike van suurstof
- 1.5 Collecting oxygen / Opvang van suurstof
- 1.6 The positive test for oxygen / Die positiewe toets vir suurstof

2. Hydrogen / Waterstof

- 2.1 The occurrence of hydrogen / Die voorkoms van waterstof

- 2.2 The characteristics of hydrogen / Die eienskappe van waterstof
- 2.3 The uses of hydrogen / Die gebruike van waterstof
- 2.4 The positive test for hydrogen / Die positiewe toets vir waterstof

Fourth term / Vierde kwartaal

3. Carbon dioxide / Koolstofdioksied

- 3.1 The occurrence of carbon dioxide / Die voorkoms van koolstofdioksied
- 3.4 The characteristics of carbon dioxide / Die eienskappe van koolstofdioksied
- 3.5 The uses of carbon dioxide / Die gebruike van koolstofdioksied
The positive test for carbon dioxide / Die positiewe toets vir koolstofdioksied

4. Chloor / Chlorine

- 4.1 Bereiding van chloorgas./ Preparing chlorine gas
- 4.2 Eienskappe van chloorgas./ Properties of chlorine gas
- 4.3 Gebruike van chloorgas./ Uses of chlorine gas

5. Stikstof / Nitrogen

- 5.1 Voorkoms van stikstofgas./ Appearance of nitrogen gas
- 5.2 Die stikstofsiklus./ The hydrogen cycle
- 5.3 Euretifikasie./ Euretrophication
- 5.4 Gebruike van stikstofgas./ Uses of nitrogen gas

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Eerste kwartaal / First term

A) *Inleiding tot Fisiese Wetenskappe / Introduction to Physical Sciences*
Die Wetenskaplike metode./ The Scientific method.

B) *Elektrisiteit / Electricity*

- 1. Die uitwerking van gelaaiete voorwerpe op mekaar/ The effect of charged objects on each other
- 2. Hoe om 'n elektrokoop te laai / How to charge an electroscope
- 3. Statiese elektrisiteit / Static electricity
- 4. Die magneetveld van 'n staafmagneet / The magnetic field of a bar magnet
- 5. Die elektromagneet / The electromagnet
- 6. Die regterhandreël / The right hand rule
- 7. Stroombane / Electric circuits
- 8. Gebruik van formules / Use of formulae

Tweede kwartaal / Second term

C) *Materie en Materiale / Matter and materials*

1. Elemente en verbindings./ Elements and compounds
 - a. Die periodieke tabel./ The Periodic Table
 - b. Atome en molekules./ Atoms and molecules
 - c. Maak van modelle van verskillende verbindings./ Making models of different compounds
 - d. Eienskappe van elemente verskil van die eienskappe van verbindings./ Properties of elements differ from the properties of compounds
2. Skeidingsmetodes van mengsels en verbindings./ Methods of separating mixtures and compounds

Derde kwartaal / Third term

D) *Chemiese reaksies – Sure en Basisse / Chemical reactions – acids and bases*

1. Die verskil tussen sure en basisse./ The differences between acids and bases
2. Wat is 'n alkalie?/ What is an alkali?
3. Die verskil tussen 'n sterk suur en 'n swak suur./ The difference between a strong and a weak acid
4. Die verskil tussen 'n gekonsentreerde suur en 'n verdunde suur./ The difference between a concentrated and a diluted acid
5. Die pH skaal./ The pH scale
6. Indikators./ Indicators
7. Reaksies van sure met / Reactions of acids with:
 - a. alkalies / alkali's
 - b. metale / metals
 - c. Metaaloksiede / metal oxides
 - d. metaalkarbonate / metal carbonates

E) *Kragte / Forces*

1. Kontakkrigte / Contact forces
2. Nie-kontakkrigte / Non contact forces
3. Kragte en energie / Forces & energy

Vierde kwartaal / Fourth term

F) *Druk / Pressure*

1. Die verband tussen druk en diepte in 'n vloeistof./ The relationship between pressure and depth in a liquid
2. Druk in verskillende rigtings in 'n vloeistof. / Pressure in different directions in a liquid
3. Die verband tussen druk en digtheid van 'n vloeistof./ The relationship

between pressure and the density of a liquid

G) Lig / Light

1. Weerkaatsing van lig / Reflection of light
2. Breking van lig / Refraction of light
3. Kleur / Colour
4. Lig as 'n energiebron / Light as a source of energy

H) Mynbou in Suid – Afrika / The Mining Industry in South Africa

Mynbou: myn van yster en goud / Mining of iron and gold

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Term 1 / Kwartaal 1

- Matter and Materials Chapter 2 / Materie en Materiale Hoofstuk 2
- Kinetic Molecular Theory Chapter 3 / Die Kinetiese Molekulêre Teorie Hoofstuk 3
- The Atom Chapter 4 / Die Atoom Hoofstuk 4
- The Periodic Table Chapter 5 / Die Periodieke Tabel Hoofstuk 5
- Chemical Bonding Chapter 6 / Chemiese Binding Hoofstuk 6
- Particles that make up Substances Chapter 11 / Deeltjies waaruit stowwe bestaan Hoofstuk 11
- Introduction to Physical Science Chapter 1 + How to write a scientific report / Inleiding tot Fisiese Wetenskappe Hoofstuk 1 + Hoe om 'n wetenskaplike verslag te skryf.
- Physical and chemical change Chapter 12 / Fisiese en Chemise verandering Hoofstuk 12
- Representing chemical change Chapter 13 / Voorstelling van chemise verandering Hoofstuk 13

- *Research-video Task (EM Spectrum) / Navorsings-video Taak (EM Spektrum)*
- *Chemistry term test / Chemie kwartaal toets*

Term 2 / Kwartaal 2

- Aqueous chemistry Chapter 17 / Reaksies in waterige oplossing Hoofstuk 17
- Magnetism Chapter 14 / Magnetism Hoofstuk 14
- Electrostatics Chapter 15 / Elektrostatika Hoofstuk 15
- Electric circuits Chapter 16 / Elektriese stroombane Hoofstuk 16

- *Chemistry Practical (Aqueous solutions) / Chemie Prakties (waterige oplossing)*
- *Physics exam / Fisika Eksamen*

Term 3 / Kwartaal 3

- Vectors and scalars Chapter 19 / Vektore en skalare Hoofstuk 19
- Motion in 1D Chapter 20 / Beweging in 1D Hoofstuk 20
- Average speed, average velocity and acceleration Chapter 21 / Gemiddelde spoed, gemiddelde snelheid en versnelling Hoofstuk 21
- Graphs of motion Chapter 22 / Grafieke van beweging Hoofstuk 22
- Equations of motion Chapter 23 / Die vergelykings van beweging Hoofstuk 23
- Energy Chapter 24 / Energie Hoofstuk 24
- *Physics Practical (Ticker timer) / Fisika Prakties (Tydtikker)*
- *Physics term test / Fisika kwartaal toets*

Term 4 / Kwartaal 4

- Quantitative aspects: The mole Chapter 18 Kwantitatiewe aspekte: Die mol Hoofstuk 18
- Transverse pulse and waves Chapter 7 / Tranversale pulse en golwe Hoofstuk 7
- Longitudinal waves and sound Chapter 8 and 9 / Logitudinale golwe en klank Hoofstuk 8 en 9
- Electromagnetic spectrum Chapter 10 / Elektromagnetiese uitstraling Hoofstuk 10

PHYSICS EXAM ABOUT **ALL** THE PHYSICS CHAPTERS
 CHEMISTRY EXAM ABOUT **ALL** THE CHEMISTRY CHAPTERS

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Term 1 / Kwartaal 1

MATTER and MATERIALS / MATERIE EN MATERIALE

Atomic combinations, molecular structure / Atoomkombinasies, molekulêre strukture

- Chemical bond, molecular shape and VSEPR / Chemiese binding, molekulêre fatsoene en VSEPA

- Electronegativity and polarity of bonds / Elektronegatiwiteit en polariteit van bindings
- Bond energy and bond length / Bindingsenergie en bindingslengte

Intermolecular forces / Intermolekulêre kragte

- Intermolecular and intramolecular (interatomic) forces / Intermolekulêre- en intramolekulêre (interatomiese) kragte
- Physical state and density in terms of IMF/ Fisiese toestand en digtheid itv IMK
- Particle kinetic energy and temperature / Deeltjie kinetiese energie en temperatuur
- The chemistry of water / Die chemie van water

MECHANICS / MEGANIKA

Vectors in two dimensions / Vektore in twee dimensies

- Resultant of perpendicular vectors / Resultante van loodregte vektore
- Resolution (or solve) of a vector in horizontal and vertical components / Resolusie (of oplos) van 'n vektor in sy horisontale en vertikale komponente

Term 2 / Kwartaal 2

Newton's laws and applications of Newton's laws / Newton se wette en toepassings van Newton se wette

- Different kinds of forces: weight, normal force, frictional force, applied force, tension / Verskillende soorte kragte: gewig, normaalkrag, wrywingskrag, toegepaste krag, spanning
- Force diagrams and free body diagrams / Kragte- en vryliggaamdiagramme
- Newton's First, Second and Third laws / Newton se Eerste, Tweede en Derde wette

CHEMICAL CHANGE / CHEMIESE VERANDERING

Quantitative aspects of chemical change / Kwantitatiewe aspekte van chemiese verandering

- Molar volume of gases, concentrations of solutions, stoichiometric calculations, volume relationship in gaseous reactions / Molêre gasvolume, konsentrasie van oplossings, stoichiometrie berekeninge, volume verwantskappe in gasagtige reaksies

Term 3 / Kwartaal 3

GRAVITATIONAL AND ELECTRIC FIELDS / GRAVITASIE EN ELEKTRIESE VELDE

- Newton's Universal Law of Gravity / Newton se Universele Gravitsiewet

Electrostatics / Elektrostatika

- Coulomb's Law, Electric fields / Coulomb se wet, Elektriese velde

ELECTRICITY AND MAGNETISM / ELEKTRISITEIT EN MAGNETISME

Electromagnetism / Elektromagnetisme

- Magnetic field associated with current carrying conductors, Faraday's Law / Magnetiese velde geassosieer met stroomdraende geleiers, Faraday se wet
- Current induced by changing magnetic field / Stroom opgewek deur 'n veranderende magneetveld

Electric circuits / Elektriese stroombane

- Ohm's Law, Power and Energy / Ohm se wet, Drywing en Energie

CHEMICAL CHANGE / CHEMIESE VERANDERING

Energy and chemical change / Energie en chemiese verandering

- Energy change in reactions that is associated with change in bond energy / Energieveranderinge in reaksies wat verband hou met die verandering van bindingsenergie
- Exothermic and endothermic reactions / Eksotermiese en endotermiese reaksies
- Activation energy / Aktiveringsenergie

CHEMICAL CHANGE / CHEMIESE VERANDERING

Types of reactions / Soorte reaksies

- Acids & Bases / Sure & Basisse
- Redox reactions / Redoksreaksies
- Oxidation numbers / Oksidasiegetalle

Term 4 / Kwartaal 4

MATTER and MATERIALS / MATERIE EN MATERIALE

Ideal gases and thermal properties / Ideale gasse en termiese eienskappe

- Motion of particles / Beweging van deeltjies
- Kinetic molecular theory of gases / Kinetiese molekulêre teorie van gasse
- Ideal gas law / Ideale gaswet
- Temperature, heating and pressure / Temperatuur, verhitting en druk

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Term 1 / Kwartaal 1

CHEMICAL CHANGE / CHEMIESE VERANDERING

Electrochemical reactions / Elektrochemiese reaksies

- Electrolytic and galvanic cells / Eletrolitiese- en galvaniese selle
- Relation of current and potential to rate and equilibrium / Verwantskap van stroom en potensiaal tot tempo en ewewig
- Understanding of the process and redox reactions taking place in cells / Begrip van die proses en redoksreaksies wat in selle plaasvind.
- Standard electrode potentials / Standaard elektrode potensiale

- Writing of equations representing oxidation and reduction halfreactions and redox reactions / Skryf van vergelykings wat oksidasie en reduksie halfreaksies en redoksreaksies verteenwoordig.
- Oxidation numbers and application of oxidation numbers / Oksidasiegetalle en toepassing van oksidasiegetalle
- Chemical industry / Chemiese industrie
- Electrochemistry / Elektrochemie
- The Chlor-alkali industry / die Chloor-alkalie industrie

ELECTRICITY AND MAGNETISM / ELEKTRISITEIT EN MAGNETISME

Electric circuits / Elektriese stroombane

- Internal resistance networks / Interne weerstand en serie en parallelle netwerke

Electrodynamics / Elektrodinamika

- Electrical machines (generators & motors) / Elektriese masjienerie (generators en motors)
- Alternating current / Wisselstroom

MATTER and MATERIALS / MATERIE EN MATERIALE

Organic chemistry / Organiese chemie

- Organic molecular structures – functional groups, saturated and unsaturated structures, isomers / Organiese molekulêre strukture – funksionele groepe, versadigde en oversadigde strukture, isomere
- IUPAC naming and formulae / IUPAC name en formules
- Structure physical property relationships / Struktuur fisiese verwantskappe

Term 2 / Kwartaal 2

- Applications of organic chemistry / Toepassings van organiese chemie
- Substitution, addition & elimination reactions / Substitusie-, addisie- & eliminasie-reaksies

MECHANICS / MEGANIKA

Momentum and impulse / Momentum en impuls

- Momentum / Momentum
- Newton's second law in terms with momentum / Newton se 2de wet i.t.v momentum
- Conservation of momentum and elastic and inelastic collisions / Behoud van momentum en elastiese en onelastiese botsings
- Impulse / Impuls

Vertical projectile motion in one dimension / Vertikale projektielbeweging in een dimensie

- Vertical projectile motion (1D) in words, diagrams and graphs / Vertikale projektielbeweging (1D) in woorde, diagramme en grafieke.
- Near the surface of the earth and in the absence of air friction / Naby die oppervlak van die aarde in die afwesigheid van lugweerstand.

Chemical equilibrium / Chemiese ewewig

- Chemical equilibrium and factors affecting equilibrium / Chemiese ewewig en faktore wat ewewig beïnvloed
- Equilibrium constant / Ewewigskonstante
- Application of equilibrium principles / Toepassings van ewewigsbeginsels

Acids & bases / Sure & basisse

- Acid-base reactions / Suur-basisreaksies

CHEMICAL CHANGE / CHEMIESE VERANDERING

Rate and extent of reaction / Reakietempo en omvang van reaksies

- Factors affecting rate / Faktore wat tempo beïnvloed
- Measuring rate of reactions / Meet tempo van reaksies
- Mechanism of reaction and catalysis / Reaksiemeganisme en katalise

Term 3 / Kwartaal 3

MECHANICS / MEGANIKA

Work, energy & power / Werk, energie & drywing

- Definition of work / Definisie van werk
- Work-energy theorem / Arbeid-energie teorie
- Conservation of energy / Behoud van energie
- Power / Drywing

CHEMICAL CHANGE / CHEMIESE VERANDERING

MATTER and MATERIALS / MATERIE EN MATERIALE

Optical phenomena & properties of materials / Optiese verskynsels & eienskappe van materiale

- Photoelectric effect / Fotoëlektriese effek

Emission & absorption spectra / Emissie- & absorpsiespektra