GENERAL INFORMATION
PHYSICAL SCIENCE

GR 10, 11 & 12

NAME	
CELL NUMBER	
EMAIL ADDRESS	

Remember: You write in matric on Grade 11 and 12 work. You should keep your Grade 11 textbooks and notes for matric. By the end of Grade 11, you will need short summaries of the Grade 11 work, for fast learning in matric.

MODUS OPERANDI FOR PHYSICAL SCIENCE:

1. Work through the work you are going to do at school the next day.
2. Write down all the questions you have about the work and ask the teacher when he / she do the work with you the next day.
3. Take notes during class.
4. Use the notes from class, together with the theory of at least two text books and make summaries of the work.
5. Do homework, practice the math and learn the theory.
6. According to Bloom's taxonomy:

BLOOM se TAXSONOMY			Average Test Mark
1. Partial Knowledge	Remember fact partially.	You do new work in class.	30%
2. Knowledge	Remember facts	You stay current with the work and make summaries.	40%
3. Understanding	Understand the work. Able to discuss work.	You know what is going on in the work and can explain it to your friends.	50%
4. Application	Can use your knowledge in unfamiliar situations.	This is the unfamiliar sums in the test.	60%
5. Analysis	Analysis of bigger parts to use principles to analyse sums.	Sort the information in your sum, analyse the sum to see which principle is applicable. Do one or more sums to get an answer.	70%
6. Synthesis	Put all the small part together to form the total picture.	Use information from previous answers to deduct information	80%
7. Evaluation	Review according to certain criteria	Deduct information from previous answer to form opinion.	90 – 100%

What is important here is that each step in this process requests that you revise the theory again or practice the sums. What I would suggest is that you work in advance, i.e. reading and revising the work before the teacher deals with you. It gives you a 10% lead in the learning process. From this process you will see that a lot of repetition is necessary. Just doing your homework and then quickly learning before a test gives you about 40% knowledge. You will therefore have to put in a lot more. For a test, you will have to learn your theory very well, because now you have to know it for theoretical questions and still apply formulas to theory. Then you practice a lot of math. You will therefore need to go through your work again and again each time (now you need to practice other sums, preferably harder sums), to do better and better in the work. If you revise the work about 5 times, you are at the level where you can easily do all the work. It's also why Grade 11 work gets easier if you study it again in matric.

1 Formulas:

a. Before starting with the work, make a summary of the formulas on a coloured piece of A5 paper (half of a normal A4 paper) at every chapter. This piece of paper is loose therefore you do not have to look for the formulas in your book every time you work. As soon as you have to look for the formulas in your book you lose concentration and this impedes the learning process.
b. Focus on which formulas are given and which ones you have to know. Mark them on your card and study them.
c. Place this loose card in your workbook. Use the card in class as well as for your homework. Because of the fact that you are using the card now you are utilizing the wonderful function of the sub-conscious that helps you to remember information after a period of time (by repeatedly looking at the same information). This information gets imprinted into your brain like a scan or a copy and you will then start to remember it in the same way.
d. Put each Formula card in a safe place in order to use it again to study for tests and exams.

4 Start in Grade 11 already to collect the information needed for Grade 12. You get a lot of the information in Grade 10 already and you still have to know and use it in Matric. Put this information in your Science folder. Use the following information to make an index for your folder.

COMPOUND IONS (RADICALS)

Single Charge		Double Charge		Three Doubled Charge	
NH_4^+	Ammonium	CO_3^{2-}	Carbonate	PO_4^{3-}	Phosphate
H_3O^+	Hydronium	SO_4^{2-}	Sulphate		
OH^-	Hydroxyl	SO_3^{2-}	Sulfite		
NO_3^-	Nitrate	CrO_4^{2-}	Chromate		
NO_2^-	Nitrite	$Cr_2O_7^{2-}$	Dichromate		
$C\ell O_3^-$	Chlorate	$S_2O_3^{2-}$	Thiosulfate		
MnO_4^-	Per manganite	Mno_4^{2-}	Manganite		
HCO_3^-	Hydrogen Carbonate				
IO_3^-	Iodate				
HSO_4^-	Hydrogen Sulphate				
HSO_3^-	Bisulfite				
$CH_3CO O^-$	Acetate				
HCO_3^-	Hydrogen Carbonate				
CNS^-	Thiosianate				

The ions of atoms (that are formed by taking or emitting electrons) will have the charge of the group they are in.

Positive charges:	group 1 - 1+	group 2 - 2+	group 3 - 3+
Negative charges for, and	group 7 - 1-	Group 6 - 2-	group 5 - 3-

Group 8 never has a charge.

CHEMICAL NAMES, CHEMICAL FORMULAS & EVERYDAY NAMES

Alledaagse Naam	Formule	Common Name	Chemiese Naam	Chemical Name
Koeksoda	$NaHCO_3$	Baking Soda	Natriumbikarbonaat	Sodium Bicarbonate
Wassoda	Na_2CO_3		Natriumkarbonaat	Sodium Carbonate
Bytsoda	NaOH	Caustic Soda	Natriumhidroksied	Sodium Hydroxide
Bypotas	KOH	Caustic Potash	Kaliumhidroksied	Potassium Hydroxide
Gebluste Kalk	$Ca(OH)_2$	Slaked Lime	Kalsiumhidroksied	Calcium Hydroxide
Kalksteen/Marmer	$CaCO_3$	Limestone/Marble	Kalsiumkarbonaat	Calcium Carbonate
Koolstofbisulfied	CS_2	Carbondisulfide	Koolstofbisulfied	Carbon Bisulphide
Swaelwaterstof	H_2S	Sulphuretted Hydrogen	Waterstofsulfied	Hydrogen Sulphide
Soutsuur	HCℓ	Hydrochloric Acid	Waterstofchloried	Hydrogen Chloride
Salpetersuur	HNO_3	Nitric Acid	Waterstofnitraat	Hydrogen Nitrate
Swaelsuur	H_2SO_4	Sulfuric Acid	Waterstofsulfaat	Hydrogen Sulphate
Koolsuurgas	CO_2	Carbonic Acid Gas	Koolstofdioksied	Carbon Dioxide
Swaelligsuur	H_2SO_3	Sulphurous Acid	Waterstofsulfiet	Hydrogen Sulphite
Koolsuur	H_2CO_3	Carbonic Acid	Waterstofkarbonaat	Hydrogen Carbonate
Salpeterigsuur	HNO_2	Nitrous Acid	Waterstofnitriet	Hydrogen Nitrite
Blou Vitrioel	$CuSO_4$	Blue vitriol	Koper (II) Sulfaat	Copper (II) Sulphate
Engelse Sout	$MgSO_4$	Epsom Salt	Magnesiumsulfaat	Magnesium Sulphate
Tafelsout	NaCℓ	Table Salt	Natriumchloried	Sodium Chloride
Miersuur	CH_3OOH	Formic Acid	Metanoë suur	Metanoic acid
Asynsuur	CH_3COOH	Acetic Acid	Etanoësuur	Ethanoic acid

AMOUNT, SYMBOL, UNIT

Quantity/Hoeveelheid	Suggested Symbol	Alternative symbol	Unit	Unit symbol
Mass/massa	m		kilogram	kg
Position/posisie	x,y		metre	m
Displacement/verplasing	Δx,Δy	s	metre	m
Velocity/snelheid	v_{x1} v_y	u,v	metre per second	$m{\cdot}s^{-1}$
Initial velocity/beginsnelheid	v_i	U	metre per second	$m{\cdot}s^{-1}$
Final velocity/eindsnelheid	v_f	V	metre per second	$m{\cdot}s^{-1}$
Acceleration/versnelling	a		metre per second per second	$m{\cdot}s^{-2}$
Acceleration due to gravity/ Gravitasieversnelling	g		metre per second per second	$m{\cdot}s^{-2}$
Time (instant)/tyd	t		second	s
Time interval/tydsinterval	Δt		second	s

Quantity/Hoeveelheid	Suggested Symbol	Alternative symbol	Unit	Unit symbol
Energy/energie	E		joule	J
Kinetic energy/kinetiese energie	K	E_k	joule	J
Potential energy/potensiële energie	U	E_p	joule	J
Work/arbeid	W		joule	J
Work function/werksfunksie	W_0		joule	H
Power/arbeidstempo/drywing	P		watt	W
Momentum/momentum	p		kilogram metre per second	$kg \cdot m \cdot s^{-1}$
Force/krag	F		newton	N
Weight/gewig	w	F_g	newton	N
Normal force/normaalkrag	N	F_N	newton	N
Tension/spankrag	T	F_T	newton	N
Friction force/wrywingskrag	f	F_f	newton	N
Coefficient of friction/ wrywingskoëffisiënt	μ, μ_s, μ_k		(none)	
Torque/wringkrag/moment	τ		newton metre	N·m
Wavelength/golflengte	λ		metre	m
Frequency/frekwensie	f	v	hertz or per second	Hz or s^{-1}
Period/periode	T		second	s
Speed of light/spoed van lig	c		metre per second	$m \cdot s^{-1}$
Refractive index/brekings-indeks	n		(none)	
Focal length/brandpunt-afstand	f		metre	m
Object distance/voorwerp-afstand	s	U	metre	m
Image distance/beeldafstand	s'	V	metre	m
Magnification/vergroting	m		(none)	
Charge/lading	Q,q		coulomb	C
Electric field/elektriese veldsterkte	E		newton per coulomb or volt per metre	$N \cdot C^{-1}$ or $V \cdot m^{-1}$
Electric potential at P/ elektriese potensiaal by P	V_P		volt	V
Potential difference/ potensiaalverskil	ΔV, V		volt	V
emf/emk		ε	volt	V
Current/stroom	I, i		ampere	A
Resistance/weerstand	R		ohm	Ω
Internal resistance/interne weerstand	r		ohm	Ω
Magnetic field/magnetiese veld	B		tesla	T
Magnetic flux/magnetiese vloed	Φ		tesla·metre^2 or weber	$T \cdot m^2$ or Wb
Capacitance/kapasitansie	C		farad	F
Inductance/induktansie	L		henry	H

INFORMATION SHEET

QUESTION PAPER 1: PHYSICS

Table 1: Physical Constants

NAME	SYMBOL	VALUE
Gravity acceleration	g	9,8 $m \cdot s^{-2}$
Speed of light in a vacuum	c	3,0 x 10^{8} $m \cdot s^{-1}$
Planck's constant	h	6,63 x 10^{-34} J·s
Coulomb's constant	k	9,0 x 10^{9} $N \cdot m^{2} \cdot C^{-2}$
Charge on electron	e	-1,6 x 10^{-19} C
Electron mass	m_e	9,11 x 10^{-31} kg
Permittivity of free space	ε_0	8,85 x 10^{-12} $F \cdot m^{-1}$

MOVEMENT

$v_f = v_i + a\Delta t$	$\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$ or/of $\Delta y = v_i \Delta t + \frac{1}{2} g \Delta t^2$
$v_f^2 = v_i^2 + 2a\Delta x$ or/of $v_f^2 = v_i^2 + 2g\Delta y$	

FORCE

$F_{net} = ma$	$p = mv$
$F_{net}\Delta t = \Delta p = mv_f - mv_i$	$w = mg$
$F_{Net} = \frac{\Delta p}{\Delta t}$	$F = \frac{GM^1m^2}{r^2}$

LABOR, ENERGY AND POWER

$W = F\Delta x \cos\theta$	$U = mgh$ or/of $E_P = mgh$
$K = \frac{1}{2} mv^2$ or/of $E_k = \frac{1}{2} mv^2$	$W_{net} = \Delta K = K_f - K_i$ $W_{net} = \Delta E_k = E_{kf} - E_{ki}$
$P = \frac{W}{\Delta t}$	$P = Fv$

WAVES, SOUND AND LIGHT

$v = f\lambda$	$T = \frac{1}{f}$
$f_L = \frac{v \pm v_L}{v \pm v_s} f_s$	$E = hf$ or/of $E = h\frac{c}{\lambda}$
$\sin\theta = \frac{m\lambda}{a}$	$hf = W_0 + \frac{1}{2}mv^2$ $hf = hf_0 + \frac{1}{2}mv^2$

ELECTROSTATICS

$F = \frac{kQ_1Q_2}{r^2}$	$E = \frac{kQ}{r^2}$	$F = \frac{P}{v}$
$E = \frac{V}{d}$	$E = \frac{F}{q}$	W = F d
$U = \frac{kQ_1Q_2}{r}$	$V = \frac{W}{q}$	W = qEd
$C = \frac{Q}{V}$	$C = \frac{\varepsilon_0 A}{d}$	

ALTERNATING CURRENT

$I_{rms} = \frac{I_{max}}{\sqrt{2}}$ / $I_{wgk} = \frac{I_{maks}}{\sqrt{2}}$ $V_{rms} = \frac{V_{max}}{\sqrt{2}}$ / $V_{wgk} = \frac{V_{maks}}{\sqrt{2}}$	$P_{average} = V_{rms}I_{rms}$ or/of $P_{gemiddeld} = V_{wgk}I_{wgk}$ $P_{average} = I_{rms}^2R$ or/of $P_{gemiddeld} = I_{wgk}^2R$ $P_{average} = \frac{V_{rms}^2}{R}$ or/of $P_{gemiddeld} = \frac{V_{wgk}^2}{R}$

ELECTRICAL CIRCUIT

$R = \frac{V}{I}$	$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \ldots$	
$R_s = R_1 + R_2 + \ldots$	emf (ε) = I(R + r)	
$q = I\Delta t$	emk (ε) = I(R + r)	
$P = \frac{W}{\Delta t}$ $P = VI$ $P = I^2R$ $P = \frac{V^2}{R}$ P = FV	W = Vq $W = VI\Delta t$ $W = I^2R\Delta t$ $W = \frac{V^2\Delta t}{R}$ W = Pt	$F = \frac{P}{V}$ $E = \frac{kQ}{r}$

INFORMATION SHEET

QUESTION PAPER 2: CHEMISTRY

Physical constants

NAME/*NAAM*	SYMBOL/*SIMBOOL*	VALUE/*WAARDE*
Standard pressure **Standaarddruk**	p^{θ}	1,013 x 10^5 Pa
Molar gas volume at STP **Molêre gasvolume by STD**	V_m	22,4 $dm^3 \cdot mol^{-1}$
Standard temperature **Standaardtemperatuur**	T^{θ}	273 K

FORMULAS

$n = \frac{m}{M}$	$c = \frac{n}{V}$ or/*of* $c = \frac{m}{MV}$
$q = I \Delta t$ $W = Vq$	$E^{\theta}_{cell} = E^{\theta}_{cathode} - E^{\theta}_{anode}$ / $E^{\theta}_{sel} = E^{\theta}_{katode} - E^{\theta}_{anode}$ or/*of* $E^{\theta}_{cell} = E^{\theta}_{reduction} - E^{\theta}_{oxidation}$ / $E^{\theta}_{sel} = E^{\theta}_{reduksie} - E^{\theta}_{oksidasie}$ or/*of* $E^{\theta}_{cell} = E^{\theta}_{oxidisingagent} - E^{\theta}_{reducingagent}$ / $E^{\theta}_{sel} = E^{\theta}_{oksideermiddel} - E^{\theta}_{reduseermiddel}$

Comparative summary Electrochemistry

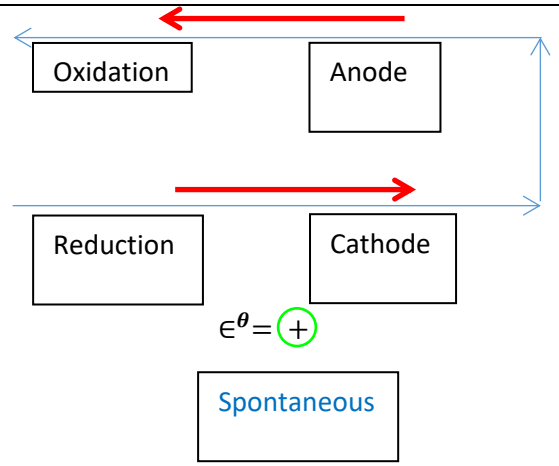
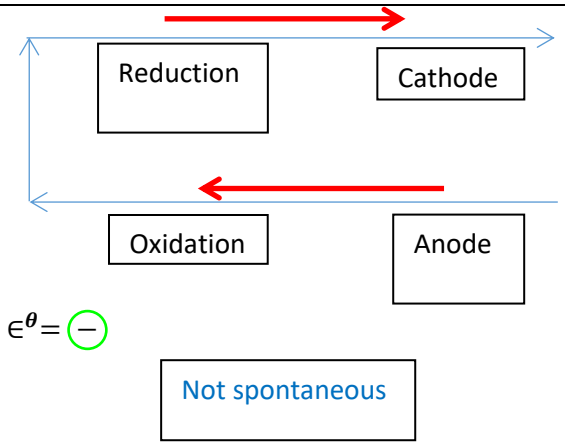
<table>
<tr><th>Voltaic cell</th><th>Electrolytic cell</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Electron flow →</td><td>Electron flow ←</td></tr>
<tr><td>Anode (-)
Cathode (+)</td><td>Anode (+)
Cathode (-)</td></tr>
<tr><td>Oxidation means: remove e^- from another substance</td><td>Reduction means: give e^- to another substance</td></tr>
<tr><td>2 separate half cells</td><td>One cell, sometimes with a membrane</td></tr>
<tr><td colspan="2">Oxidation: Emits e^-</td></tr>
<tr><td colspan="2">Reduction: Takes e^-</td></tr>
<tr><td colspan="2">Oxidation means: remove e^- from another substance</td></tr>
<tr><td colspan="2">Reduction means: give e^- to another substance</td></tr>
</table>

TABLE 4B: STANDARD- REDUCTION POTENTIALS

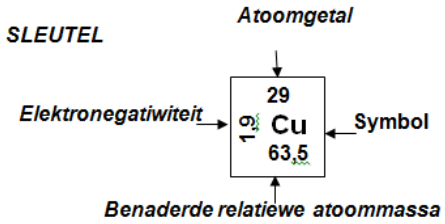
Increasing oxidising ability ↑

Increasing reducing ability ↓

Half-reactions/*Halfreaksies*	$E^{\theta}_{(V)}$
$Li^+ + e^- \rightleftharpoons Li$	− 3,05
$K^+ + e^- \rightleftharpoons K$	− 2,93
$Cs^+ + e^- \rightleftharpoons Cs$	− 2,92
$Ba^{2+} + 2e^- \rightleftharpoons Ba$	− 2,90
$Sr^{2+} + 2e^- \rightleftharpoons Sr$	− 2,89
$Ca^{2+} + 2e^- \rightleftharpoons Ca$	− 2,87
$Na^+ + e^- \rightleftharpoons Na$	− 2,71
$Mg^{2+} + 2e^- \rightleftharpoons Mg$	− 2,36
$A\ell^{3+} + 3e^- \rightleftharpoons A\ell$	− 1,66
$Mn^{2+} + 2e^- \rightleftharpoons Mn$	− 1,18
$Cr^{2+} + 2e^- \rightleftharpoons Cr$	− 0,91
$2H_2O + 2e^- \rightleftharpoons H_2(g) + 2OH^-$	− 0,83
$Zn^{2+} + 2e^- \rightleftharpoons Zn$	− 0,76
$Cr^{3+} + 3e^- \rightleftharpoons Cr$	− 0,74
$Fe^{2+} + 2e^- \rightleftharpoons Fe$	− 0,44
$Cr^{3+} + e^- \rightleftharpoons Cr^{2+}$	− 0,41
$Cd^{2+} + 2e^- \rightleftharpoons Cd$	− 0,40
$Co^{2+} + 2e^- \rightleftharpoons Co$	− 0,28
$Ni^{2+} + 2e^- \rightleftharpoons Ni$	− 0,27
$Sn^{2+} + 2e^- \rightleftharpoons Sn$	− 0,14
$Pb^{2+} + 2e^- \rightleftharpoons Pb$	− 0,13
$Fe^{3+} + 3e^- \rightleftharpoons Fe$	− 0,06
$2H^+ + 2e^- \rightleftharpoons H_2(g)$	**0,00**
$S + 2H^+ + 2e^- \rightleftharpoons H_2S(g)$	+ 0,14
$Sn^{4+} + 2e^- \rightleftharpoons Sn^{2+}$	+ 0,15
$Cu^{2+} + e^- \rightleftharpoons Cu^+$	+ 0,16
$SO_4^{2-} + 4H^+ + 2e^- \rightleftharpoons SO_2(g) + 2H_2O$	+ 0,17
$Cu^{2+} + 2e^- \rightleftharpoons Cu$	+ 0,34
$2H_2O + O_2 + 4e^- \rightleftharpoons 4OH^-$	+ 0,40
$SO_2 + 4H^+ + 4e^- \rightleftharpoons S + 2H_2O$	+ 0,45
$Cu^+ + e^- \rightleftharpoons Cu$	+ 0,52
$I_2 + 2e^- \rightleftharpoons 2I^-$	+ 0,54
$O_2(g) + 2H^+ + 2e^- \rightleftharpoons H_2O_2$	+ 0,68
$Fe^{3+} + e^- \rightleftharpoons Fe^{2+}$	+ 0,77
$NO_3^- + 2H^+ + e^- \rightleftharpoons NO_2(g) + H_2O$	+ 0,80
$Ag^+ + e^- \rightleftharpoons Ag$	+ 0,80
$Hg^{2+} + 2e^- \rightleftharpoons Hg(\ell)$	+ 0,85
$NO_3^- + 4H^+ + 3e^- \rightleftharpoons NO(g) + 2H_2O$	+ 0,96
$Br_2(\ell) + 2e^- \rightleftharpoons 2Br^-$	+ 1,07
$Pt^{2+} + 2e^- \rightleftharpoons Pt$	+ 1,20
$MnO_2 + 4H^+ + 2e^- \rightleftharpoons Mn^{2+} + 2H_2O$	+ 1,23
$O_2(g) + 4H^+ + 4e^- \rightleftharpoons 2H_2O$	+ 1,23
$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightleftharpoons 2Cr^{3+} + 7H_2O$	+ 1,33
$C\ell_2(g) + 2e^- \rightleftharpoons 2C\ell^-$	+ 1,36
$MnO_4^- + 8H^+ + 5e^- \rightleftharpoons Mn^{2+} + 4H_2O$	+ 1,51
$H_2O_2 + 2H^+ + 2e^- \rightleftharpoons 2H_2O$	+1,77
$Co^{3+} + e^- \rightleftharpoons Co^{2+}$	+ 1,81
$F_2(g) + 2e^- \rightleftharpoons 2F^-$	+ 2,87

The Periodic Table

TABLE 3: THE PERDIOC TABLE OF ELEMENT



1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
1 2,1 H 1																	2 He 4
3 1,0 Li 7	4 1,5 Be 9											5 2,0 B 11	6 2,5 C 12	7 3,0 N 14	8 3,5 O 16	9 4,0 F 19	10 Ne 20
11 0,9 Na 23	12 1,2 Mg 24											13 1,5 Aℓ 27	14 1,8 Si 28	15 2,1 P 31	16 2,5 S 32	17 3,0 Cℓ 35,5	18 Ar 40
19 0,8 K 39	20 1,0 Ca 40	21 1,3 Sc 45	22 1,5 Ti 48	23 1,6 V 51	24 1,6 Cr 52	25 1,5 Mn 55	26 1,8 Fe 56	27 1,8 Co 59	28 1,8 Ni 59	29 1,9 Cu 63,5	30 1,6 Zn 65	31 1,6 Ga 70	32 1,8 Ge 73	33 2,0 As 75	34 2,4 Se 79	35 2,8 Br 80	36 Kr 84
37 0,8 Rb 86	38 1,0 Sr 88	39 1,2 Y 89	40 1,4 Zr 91	41 Nb 92	42 1,8 Mo 96	43 1,9 Tc	44 2,2 Ru 101	45 2,2 Rh 103	46 2,2 Pd 106	47 1,9 Ag 108	48 1,7 Cd 112	49 1,7 In 115	50 1,8 Sn 119	51 1,9 Sb 122	52 2,1 Te 128	53 2,5 I 127	54 Xe 131
55 0,7 Cs 133	56 0,9 Ba 137	57 La 139	72 1,6 Hf 179	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	81 1,8 Tℓ 204	82 1,8 Pb 207	83 1,9 Bi 209	84 2,0 Po	85 2,5 At	86 Rn
87 0,7 Fr	88 0,9 Ra 226	89 Ac															

												58 Ce 140	59 Pr 141	60 Nd 144	61 Pm	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175
												90 Th 232	91 Pa	92 U 238	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

INTRA MOLECULAR FORCES

(FORCES INSIDE A MOLECULE)

TYPE OF BINDING (of molecules, atoms, ions)	**COVALENT BINDING:** Non-metal binds with non-metal		**IONIC BINDING** Metal binds with non-metal	**METAL BINDING** Metal binds with metal (protons in sea of electrons))
TYPE OF SOLIDS	**ATOMIC**	**MOLECULAR**	**IONIC**	**METAL**
PARTS IN CRISTAL ROSTER	atoms	molecules	Anions and cations	Positive metal ions
BINDINGS-FORCES BETWEEN PARTS	Covalent binding	Van der Waal forces and hydrogen bindings	Ionic binding (Coulomb forces) Electrostatic force between + and - ions	Metal binding (Force between positive core and sea of free electrons)
STRENGTH OF FORCES	Very strong Divide electrons between atoms.	Weak	Strong	Strong (Determined by amount of delocalized electrons)
PROPERTIES OF SUBSTANCES	Extraordinarily high melting point and boiling point	Low melting points. Sublimation takes place in certain substances.	High melting points. Ionic bindings transmits electricity in solved and melted form.	Transmits electricity (delocalized electrons) extendible and malleable
EXAMPLES	Diamonds, graphite, glass	Dry ice, ice Naphtaline - sublimation	Sodium chloride (table salt), calcium carbonate (marble)	Iron, steel, copper

Standard state

(STD – standard temperatuur en druk):

- **Concentration - is 1 mol.dm^{-3}**
- **Temperature - 25°C**
- **Pressure- 1 Atmosphere**
- **Cells without metal – Pt as catalyst**

INTERMOLECULAR FORCES

(FORCES BETWEEN ATOMS, MOLECULES AND IONS)

TYPE OF FORCE		
POLAR FORCES	Dipole-dipole forces Hydrogen bindings	H_2O, $HC\ell$ HF
NON-POLAR SUBSTANCES	Weak Van der Waal's forces (London forces)	$CC\ell_4$
MELTED IONIC SUBSTANCES	Ion –ion forces	$CaC\ell_{72}$
MELTED METALS	+ atomic rests draws delocalized e	Cu

Kinetic movement theory

Solids	Liquids	Gas
Strong forces keeps the particles in a fixed pattern called the crystal roster.	**Forces** keep the particles together, but are weaker than with solids.	There are nearly no forces between particles.
Particles vibrate in their fixed positions.	Particles can switch places, they can move over one another.	A gas fills the whole container due to free movement of the particles
Has its own form.	Takes on shape of the container	Has no form, fills the container.
Has its own volume.	Has its own volume.	Fills the container, covers the volume of the container.
Particles are close together, not compressible.	Particles are close together, but not compressible.	Particles are far apart and compressible.

ACIDS AND BASES:

	STRONG	WEAK
BASES	CH_3NH_2 $NaOH$	NH_3

ACIDS	$HC\ell$ (Hydrochloric acid) HNO_3 (Nitric acid) H_2SO_4 (Sulphuric acid)	CH_3COOH (Etanoic acid) H_2CO_3 (Carbonic) $H_2O_4C_2$ (Oxalic acid)