

**CATHOLIC SECONDARY SCHOOLS ASSOCIATION
CHEMISTRY DATA SHEET**

Avogadro's constant, N_A	$6.022 \times 10^{23} \text{ mol}^{-1}$
Volume of 1 mole ideal gas: at 100 kPa and	
at 0°C (273 K)	22.71 L
at 25°C (298 K)	24.79 L
Ionisation constant for water at 25°C (298.15 K), K_w	1.0×10^{-14}
Specific heat capacity of water	$4.18 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$

Some useful formulae

$$\text{pH} = -\log_{10} [\text{H}^+] \qquad \Delta H = -mC\Delta T$$

Some standard potentials

$\text{K}^+ + \text{e}^-$	\rightleftharpoons	$\text{K}_{(s)}$	-2.94 V
$\text{Ba}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Ba}_{(s)}$	-2.91 V
$\text{Ca}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Ca}_{(s)}$	-2.87 V
$\text{Na}^+ + \text{e}^-$	\rightleftharpoons	$\text{Na}_{(s)}$	-2.71 V
$\text{Mg}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Mg}_{(s)}$	-2.36 V
$\text{Al}^{3+} + 3\text{e}^-$	\rightleftharpoons	$\text{Al}_{(s)}$	-1.68 V
$\text{Mn}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Mn}_{(s)}$	-1.18 V
$\text{H}_2\text{O} + \text{e}^-$	\rightleftharpoons	$\frac{1}{2} \text{H}_{2(g)} + \text{OH}^-$	-0.83 V
$\text{Zn}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Zn}_{(s)}$	-0.76 V
$\text{Fe}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Fe}_{(s)}$	-0.44 V
$\text{Ni}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Ni}_{(s)}$	-0.24 V
$\text{Sn}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Sn}_{(s)}$	-0.14 V
$\text{Pb}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Pb}_{(s)}$	-0.13 V
$\text{H}^+ + \text{e}^-$	\rightleftharpoons	$\frac{1}{2} \text{H}_{2(g)}$	0.00 V
$\text{SO}_4^{2-} + 4\text{H}^+ + 2\text{e}^-$	\rightleftharpoons	$\text{SO}_{2(aq)} + 2\text{H}_2\text{O}$	0.16 V
$\text{Cu}^{2+} + 2\text{e}^-$	\rightleftharpoons	$\text{Cu}_{(s)}$	0.34 V
$\frac{1}{2} \text{O}_{2(g)} + \text{H}_2\text{O} + 2\text{e}^-$	\rightleftharpoons	2OH^-	0.40 V
$\text{Cu}^+ + \text{e}^-$	\rightleftharpoons	$\text{Cu}_{(s)}$	0.52 V
$\frac{1}{2} \text{I}_{2(s)} + \text{e}^-$	\rightleftharpoons	I^-	0.54 V
$\frac{1}{2} \text{I}_{2(aq)} + \text{e}^-$	\rightleftharpoons	I^-	0.62 V
$\text{Fe}^{3+} + \text{e}^-$	\rightleftharpoons	Fe^{2+}	0.77 V
$\text{Ag}^+ + \text{e}^-$	\rightleftharpoons	$\text{Ag}_{(s)}$	0.80 V
$\frac{1}{2} \text{Br}_{2(l)} + \text{e}^-$	\rightleftharpoons	Br^-	1.08 V
$\frac{1}{2} \text{Br}_{2(aq)} + \text{e}^-$	\rightleftharpoons	Br^-	1.10 V
$\frac{1}{2} \text{O}_{2(g)} + 2\text{H}^+ + 2\text{e}^-$	\rightleftharpoons	H_2O	1.23 V
$\frac{1}{2} \text{Cl}_{2(g)} + \text{e}^-$	\rightleftharpoons	Cl^-	1.36 V
$\frac{1}{2} \text{Cr}_2\text{O}_7^{2-} + 7\text{H}^+ + 3\text{e}^-$	\rightleftharpoons	$\text{Cr}^{3+} + \frac{7}{2} \text{H}_2\text{O}$	1.36 V
$\frac{1}{2} \text{Cl}_{2(aq)} + \text{e}^-$	\rightleftharpoons	Cl^-	1.40 V
$\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^-$	\rightleftharpoons	$\text{Mn}^{2+} + 4\text{H}_2\text{O}$	1.51 V
$\frac{1}{2} \text{F}_{2(g)} + \text{e}^-$	\rightleftharpoons	F^-	2.89 V

THE PERIODIC TABLE

KEY																																																																																																																																																																											
Atomic Number		Symbol of element		Atomic Weight		Name of element																																																																																																																																																																					
79	Au	197.0	Gold	5	B	10.81	Boron	6	C	12.01	Carbon	7	N	14.01	Nitrogen	8	O	16.00	Oxygen	9	F	19.00	Fluorine	10	Ne	20.18	Neon	18	Ar	39.95	Argon	36	Kr	83.80	Krypton	54	Xe	131.3	Xenon	86	Rn	[222.0]	Radon	118	Uuo	—	Ununoctium																																																																																																																												
1	H	1.008	Hydrogen	3	Li	6.941	Lithium	4	Be	9.012	Beryllium	11	Na	22.99	Sodium	12	Mg	24.31	Magnesium	19	K	39.10	Potassium	37	Rb	85.47	Rubidium	55	Cs	132.9	Cesium	87	Fr	[223.0]	Francium	21	Sc	44.96	Scandium	39	Y	88.91	Yttrium	57-71	Lanthanides	89-103	Actinides																																																																																																																												
23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides																																
22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides																												
21	Sc	44.96	Scandium	22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides																								
20	Ca	40.08	Calcium	21	Sc	44.96	Scandium	22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides																				
19	K	39.10	Potassium	20	Ca	40.08	Calcium	21	Sc	44.96	Scandium	22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides																
18	Ar	39.95	Argon	19	K	39.10	Potassium	20	Ca	40.08	Calcium	21	Sc	44.96	Scandium	22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides												
17	Cl	35.45	Chlorine	18	Ar	39.95	Argon	19	K	39.10	Potassium	20	Ca	40.08	Calcium	21	Sc	44.96	Scandium	22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides								
16	S	32.07	Sulfur	17	Cl	35.45	Chlorine	18	Ar	39.95	Argon	19	K	39.10	Potassium	20	Ca	40.08	Calcium	21	Sc	44.96	Scandium	22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides				
15	P	30.97	Phosphorus	16	S	32.07	Sulfur	17	Cl	35.45	Chlorine	18	Ar	39.95	Argon	19	K	39.10	Potassium	20	Ca	40.08	Calcium	21	Sc	44.96	Scandium	22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62	Strontium	39	Y	88.91	Yttrium	40	Zr	91.22	Zirconium	41	Nb	92.91	Niobium	42	Mo	95.94	Molybdenum	43	Tc	[98.91]	Technetium	44	Ru	101.1	Ruthenium	45	Rh	102.9	Rhodium	46	Pd	106.4	Palladium	47	Ag	107.9	Silver	48	Cd	112.4	Cadmium	49	In	114.8	Indium	50	Sn	118.7	Tin	51	Sb	121.8	Antimony	52	Te	127.6	Tellurium	53	I	126.9	Iodine	54	Xe	131.3	Xenon	55	Cs	132.9	Cesium	56	Ba	137.3	Barium	57-71	Lanthanides	89-103	Actinides
14	Si	28.09	Silicon	15	P	30.97	Phosphorus	16	S	32.07	Sulfur	17	Cl	35.45	Chlorine	18	Ar	39.95	Argon	19	K	39.10	Potassium	20	Ca	40.08	Calcium	21	Sc	44.96	Scandium	22	Ti	47.87	Titanium	23	V	50.94	Vanadium	24	Cr	52.00	Chromium	25	Mn	54.94	Manganese	26	Fe	55.85	Iron	27	Co	58.93	Cobalt	28	Ni	58.69	Nickel	29	Cu	63.55	Copper	30	Zn	65.39	Zinc	31	Ga	69.72	Gallium	32	Ge	72.61	Germanium	33	As	74.92	Arsenic	34	Se	78.96	Selenium	35	Br	79.90	Bromine	36	Kr	83.80	Krypton	37	Rb	85.47	Rubidium	38	Sr	87.62</																																																																									