

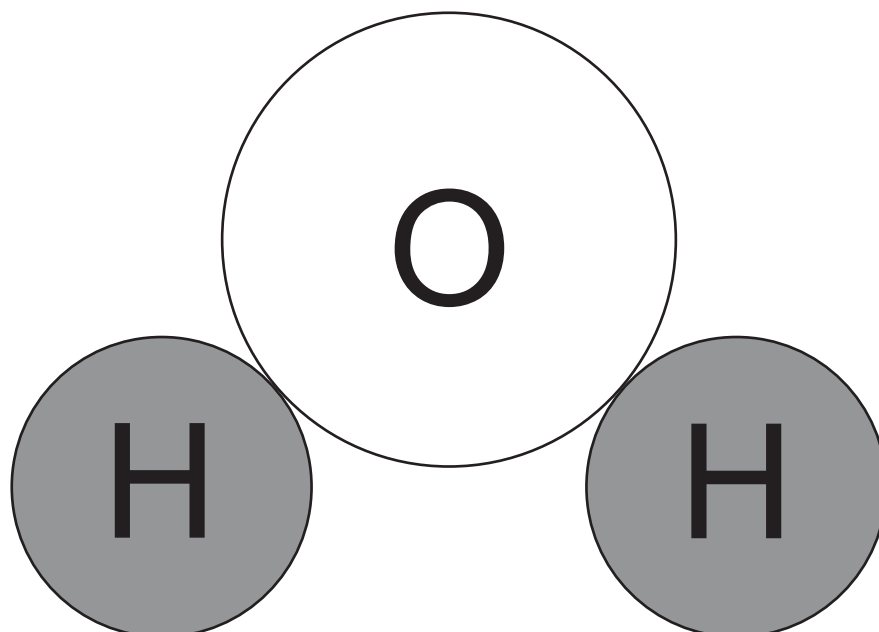
NATURAL SCIENCES

RESOURCE PACK
GRADE 9 TERM 2

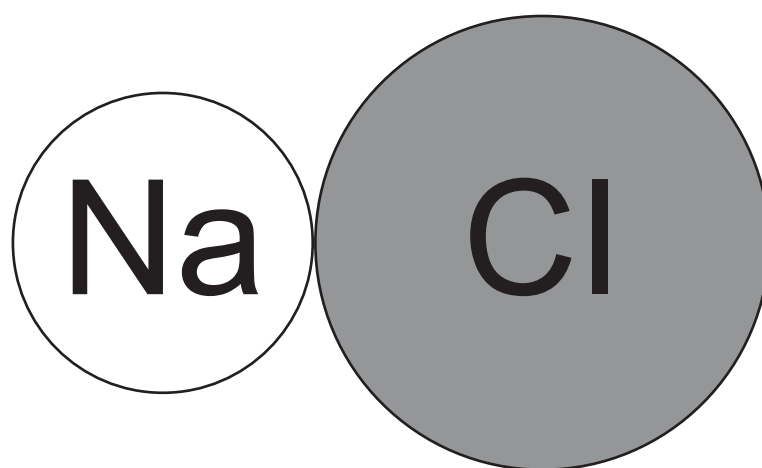


RESOURCE 1

H₂O MOLECULE & NaCl MOLECULE



H₂O MOLECULE

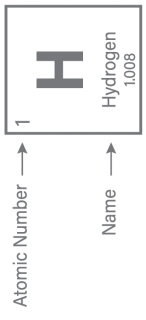


NaCl MOLECULE

THE PERIODIC TABLE OF ELEMENTS

Periodic Table of the Elements

1 IA	2 IIA	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIII	9 VIII	10 VIII	11 IB	12 IIB	13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA	
1 H Hydrogen 1.008	3 Li Lithium 6.94	11 Na Sodium 22.98976928	19 K Potassium 39.0983	37 Rb Rubidium 85.4678	55 Cs Caesium 132.90545196	87 Fr Francium (223)	2 He Helium 4.002602	10 Ne Neon 20.1797	18 Ar Argon 39.948	36 Kr Krypton 83.798	54 Xe Xenon 131.29	86 Rn Radon (222)	118 Og Oganesson (284)					
	4 Be Beryllium 9.0121831	12 Mg Magnesium 24.305	20 Ca Calcium 40.078	38 Sr Strontium 87.62	56 Ba Barium 137.327	88 Ra Radium (226)	5 B Boron 10.81	13 Al Aluminium 26.9815385	31 Ga Gallium 69.723	49 In Indium 114.818	81 Tl Thallium 204.38	113 Nh Nihonium (286)	5 B Boron 10.81	13 Al Aluminium 26.9815385	31 Ga Gallium 69.723	49 In Indium 114.818	81 Tl Thallium 204.38	113 Nh Nihonium (286)
							6 C Carbon 12.011	14 Si Silicon 28.085	32 Ge Germanium 72.630	50 Sn Tin 118.710	82 Pb Lead 207.2	114 Fl Flerovium (289)	6 C Carbon 12.011	14 Si Silicon 28.085	32 Ge Germanium 72.630	50 Sn Tin 118.710	82 Pb Lead 207.2	114 Fl Flerovium (289)
							7 N Nitrogen 14.007	15 P Phosphorus 30.973761998	33 As Arsenic 74.921595	51 Sb Antimony 121.750	83 Bi Bismuth 208.98040	115 Mc Moscovium (289)	7 N Nitrogen 14.007	15 P Phosphorus 30.973761998	33 As Arsenic 74.921595	51 Sb Antimony 121.750	83 Bi Bismuth 208.98040	115 Mc Moscovium (289)
							8 O Oxygen 15.999	16 S Sulfur 32.06	34 Se Selenium 78.971	52 Te Tellurium 127.60	84 Po Polonium (209)	116 Lv Livermorium (289)	8 O Oxygen 15.999	16 S Sulfur 32.06	34 Se Selenium 78.971	52 Te Tellurium 127.60	84 Po Polonium (209)	116 Lv Livermorium (289)
							9 F Fluorine 18.998403163	17 Cl Chlorine 35.45	35 Br Bromine 79.904	53 I Iodine 126.90447	85 At Astatine (210)	117 Ts Tennessine (284)	9 F Fluorine 18.998403163	17 Cl Chlorine 35.45	35 Br Bromine 79.904	53 I Iodine 126.90447	85 At Astatine (210)	117 Ts Tennessine (284)



57 La Lanthanum 138.90547	58 Ce Cerium 140.116	59 Pr Praseodymium 140.90766	60 Nd Neodymium 144.242	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92535	66 Dy Dysprosium 162.500	67 Ho Holmium 164.93033	68 Er Erbium 167.259	69 Tm Thulium 168.93422	70 Yb Ytterbium 173.045	71 Lu Lutetium 174.9668
89 Ac Actinium (227)	90 Th Thorium 232.0377	91 Pa Protactinium 231.03688	92 U Uranium 238.02891	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (260)

RESOURCE 2

Humdan/Shutterstock

THE PERIODIC TABLE OF ELEMENTS

Periodic Table of the Elements

		2 IIA				13 IIIA		14 IVA		15 VA		16 VIA		17 VIIA		18 VIIIA																				
1	H Hydrogen 1.008	3	Li Lithium 6.94	4	Be Beryllium 9.0121831	5	B Boron 10.81	6	C Carbon 12.011	7	N Nitrogen 14.007	8	O Oxygen 15.999	9	F Fluorine 18.998403163	10	Ne Neon 20.1797																			
11	Na Sodium 22.98976928	12	Mg Magnesium 24.305					13	Al Aluminium 26.9815385	14	Si Silicon 28.085	15	P Phosphorus 30.973761998	16	S Sulfur 32.06	17	Cl Chlorine 35.45	18	Ar Argon 39.948																	
19	K Potassium 39.0983	20	Ca Calcium 40.078	21	Sc Scandium 44.955908	22	Ti Titanium 47.887	23	V Vanadium 50.9415	24	Cr Chromium 51.9961	25	Mn Manganese 54.938044	26	Fe Iron 55.845	27	Co Cobalt 58.933194	28	Ni Nickel 58.6934	29	Cu Copper 63.546	30	Zn Zinc 65.38	31	Ga Gallium 69.723	32	Ge Germanium 72.630	33	As Arsenic 74.921595	34	Se Selenium 78.971	35	Br Bromine 79.904	36	Kr Krypton 83.798	
37	Rb Rubidium 85.4678	38	Sr Strontium 87.62	39	Y Yttrium 88.90584	40	Zr Zirconium 91.224	41	Nb Niobium 92.90637	42	Mo Molybdenum 95.95	43	Tc Technetium (98)	44	Ru Ruthenium 101.07	45	Rh Rhodium 102.90550	46	Pd Palladium 106.42	47	Ag Silver 107.8682	48	Cd Cadmium 112.414	49	In Indium 114.818	50	Sn Tin 118.710	51	Sb Antimony 121.760	52	Te Tellurium 127.60	53	I Iodine 126.90447	54	Xe Xenon 131.293	
55	Cs Caesium 132.90545196	56	Ba Barium 137.327	57 - 71 Lanthanoids			72	Hf Hafnium 178.49	73	Ta Tantalum 180.94788	74	W Tungsten 183.84	75	Re Rhenium 186.207	76	Os Osmium 190.23	77	Ir Iridium 192.227	78	Pt Platinum 195.084	79	Au Gold 196.966569	80	Hg Mercury 200.592	81	Tl Thallium 204.38	82	Pb Lead 207.2	83	Bi Bismuth 208.98040	84	Po Polonium (209)	85	At Astatine (210)	86	Rn Radon (222)
87	Fr Francium (223)	88	Ra Radium (226)	89 - 103 Actinoids			104	Rf Rutherfordium (261)	105	Db Dubnium (268)	106	Sg Seaborgium (269)	107	Bh Bohrium (270)	108	Hs Hassium (285)	109	Mt Meitnerium (278)	110	Ds Darmstadtium (281)	111	Rg Roentgenium (282)	112	Cn Copernicium (285)	113	Nh Nihonium (286)	114	Fl Flerovium (289)	115	Mc Moscovium (289)	116	Lv Livermorium (293)	117	Ts Tennessine (294)	118	Og Oganesson (294)
				Atomic Number →				← Symbol				← Atomic Weight																								
				→ H				Hydrogen 1.008																												
				Name →																																

57	La Lanthanum 138.90547	58	Ce Cerium 140.16	59	Pr Praseodymium 140.90766	60	Nd Neodymium 144.242	61	Pm Promethium (145)	62	Pm Promethium (145)	63	Eu Europium 151.964	64	Gd Gadolinium 157.25	65	Tb Terbium 158.92535	66	Dy Dysprosium 162.500	67	Ho Holmium 164.93033	68	Er Erbium 167.259	69	Tm Thulium 168.93422	70	Yb Ytterbium 173.046	71	Lu Lutetium 174.9668
89	Ac Actinium (227)	90	Th Thorium 232.0377	91	Pa Protactinium 231.03688	92	U Uranium 238.02891	93	Np Neptunium (237)	94	Pu Plutonium (244)	95	Am Americium (243)	96	Cm Curium (247)	97	Bk Berkelium (247)	98	Cf Californium (251)	99	Es Einsteinium (252)	100	Fm Fermium (257)	101	Md Mendelevium (258)	102	No Nobelium (259)	103	Lr Lawrencium (260)

THE PERIODIC TABLE OF ELEMENTS

Periodic Table of the Elements

1 IA	2 IIA											13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA	
1 H Hydrogen 1.008												5 B Boron 10.81	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998403163	10 Ne Neon 20.1797	
3 Li Lithium 6.94	4 Be Beryllium 9.0121831											13 Al Aluminum 26.9815385	14 Si Silicon 28.085	15 P Phosphorus 30.973761998	16 S Sulfur 32.06	17 Cl Chlorine 35.45	18 Ar Argon 39.948	
11 Na Sodium 22.98976928	12 Mg Magnesium 24.305											31 Ga Gallium 69.723	32 Ge Germanium 72.630	33 As Arsenic 74.921595	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798	
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955908	22 Ti Titanium 47.887	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938044	26 Fe Iron 55.845	27 Co Cobalt 58.933194	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.38	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.757	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.293	
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90584	40 Zr Zirconium 91.224	41 Nb Niobium 92.90637	42 Mo Molybdenum 95.95	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.90550	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.414	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98040	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)	
55 Cs Caesium 132.90545196	56 Ba Barium 137.327	57 - 71 Lanthanoids		72 Hf Hafnium 178.49	73 Ta Tantalum 180.94788	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 192.22	77 Ir Iridium 192.227	78 Pt Platinum 195.084	79 Au Gold 196.966569	80 Hg Mercury 200.592	113 Nh Nihonium (286)	114 Fl Flerovium (289)	115 Mc Moscovium (289)	116 Lv Livermorium (293)	117 Ts Tennessine (294)	118 Og Oganesson (294)
87 Fr Francium (223)	88 Ra Radium (226)	89 - 103 Actinoids		104 Rf Rutherfordium (261)	105 Db Dubnium (268)	106 Sg Seaborgium (269)	107 Bh Bohrium (270)	108 Hs Hassium (278)	109 Mt Meitnerium (278)	110 Ds Darmstadtium (281)	111 Rg Roentgenium (282)	112 Cn Copernicium (285)	113 Nh Nihonium (286)	114 Fl Flerovium (289)	115 Mc Moscovium (289)	116 Lv Livermorium (293)	117 Ts Tennessine (294)	118 Og Oganesson (294)

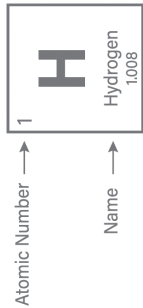


57 La Lanthanum 138.90547	58 Ce Cerium 140.116	59 Pr Praseodymium 140.90766	60 Nd Neodymium 144.242	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92535	66 Dy Dysprosium 162.500	67 Ho Holmium 164.93033	68 Er Erbium 167.259	69 Tm Thulium 168.93422	70 Yb Ytterbium 173.045	71 Lu Lutetium 174.9688
89 Ac Actinium (227)	90 Th Thorium 232.037	91 Pa Protactinium 231.03588	92 U Uranium 238.02891	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (260)

THE PERIODIC TABLE OF ELEMENTS

Periodic Table of the Elements

																		18 VIIIA	
																		2	
																		17 VIIA	
																		16 VIA	
																		15 VA	
																		14 IVA	
																		13 IIIA	
																		12 IIB	
																		11 IB	
																		10 VIII	
																		9 VIII	
																		8 VIII	
																		7 VIIB	
																		6 VIB	
																		5 VB	
																		4 IVB	
																		3 IIIB	
																		2 IIA	
																		1 IA	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
H Hydrogen 1.008	He Helium 4.002602	Li Lithium 6.94	Be Beryllium 9.0121831	B Boron 10.81	C Carbon 12.011	N Nitrogen 14.007	O Oxygen 15.999	F Fluorine 18.998403163	Ne Neon 20.1797	Na Sodium 22.98976928	Mg Magnesium 24.305	Al Aluminum 26.9815385	Si Silicon 28.0855	P Phosphorus 30.973761998	S Sulfur 32.06	Cl Chlorine 35.45	Ar Argon 39.948		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
K Potassium 39.0983	Ca Calcium 40.078	Sc Scandium 44.955908	Ti Titanium 47.867	V Vanadium 50.9415	Cr Chromium 51.9961	Mn Manganese 54.938044	Fe Iron 55.845	Co Cobalt 58.933194	Ni Nickel 58.6934	Cu Copper 63.546	Zn Zinc 65.38	Ga Gallium 69.723	Ge Germanium 72.630	As Arsenic 74.921595	Se Selenium 78.971	Br Bromine 79.904	Kr Krypton 83.798		
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54		
Rb Rubidium 85.4678	Sr Strontium 87.62	Y Yttrium 88.90584	Zr Zirconium 91.224	Nb Niobium 92.90637	Mo Molybdenum 95.95	Tc Technetium (98)	Ru Ruthenium 101.07	Rh Rhodium 102.90550	Pd Palladium 106.42	Ag Silver 107.8682	Cd Cadmium 112.414	In Indium 114.818	Sn Tin 118.710	Sb Antimony 121.760	Te Tellurium 127.60	I Iodine 126.90447	Xe Xenon 131.293		
55	56	57 - 71 Lanthanoids	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86		
Cs Cesium 132.90545196	Ba Barium 137.327		Hf Hafnium 178.49	Ta Tantalum 180.94788	W Tungsten 183.84	Re Rhenium 186.207	Os Osmium 190.23	Ir Iridium 192.227	Pt Platinum 195.084	Au Gold 196.966569	Hg Mercury 200.592	Tl Thallium 204.38	Pb Lead 207.2	Bi Bismuth 208.98040	Po Polonium (209)	At Astatine (210)	Rn Radon (222)		
87	88	89 - 103 Actinoids	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118		
Fr Francium (223)	Ra Radium (226)		Rf Rutherfordium (261)	Db Dubnium (269)	Sg Seaborgium (266)	Bh Bohrium (270)	Hs Hassium (269)	Mt Meitnerium (276)	Ds Darmstadtium (281)	Rg Roentgenium (282)	Cn Copernicium (285)	Nh Nihonium (286)	Fl Flerovium (289)	Mc Moscovium (289)	Lv Livermorium (293)	Ts Tennessine (294)	Og Oganesson (294)		



57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
La Lanthanum 138.90547	Ce Cerium 140.116	Pr Praseodymium 140.90766	Nd Neodymium 144.242	Pm Promethium (145)	Pm Promethium (145)	Sm Samarium 150.36	Eu Europium 151.964	Gd Gadolinium 157.25	Tb Terbium 158.92535	Dy Dysprosium 162.500	Ho Holmium 164.93033	Er Erbium 167.259	Tm Thulium 168.93422	Lu Lutetium 174.9668
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
Ac Actinium (227)	Th Thorium 232.0377	Pa Protactinium 231.03588	U Uranium 238.02891	Np Neptunium (237)	Am Americium (243)	Cm Curium (247)	Bk Berkelium (247)	Cf Californium (251)	Es Einsteinium (252)	Fm Fermium (257)	Md Mendelevium (258)	No Nobelium (259)	Lr Lawrencium (260)	

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	19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955908	22 Ti Titanium 47.887	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938044	26 Fe Iron 55.845	27 Co Cobalt 58.933194	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.38	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.757	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.29
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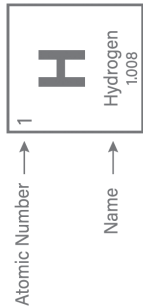


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THE PERIODIC TABLE OF ELEMENTS

Periodic Table of the Elements

																		18 VIII A	
																		2	
																		17 VII A	
																		16 VI A	
																		15 V A	
																		14 IV A	
																		13 III A	
																		12 IIB	
																		11 IB	
																		10 VIII B	
																		9 VIII B	
																		8 VIII B	
																		7 VIIB	
																		6 VIB	
																		5 VB	
																		4 IVB	
																		3 IIIB	
																		2 IIA	
																		1 IA	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
H Hydrogen 1.008	He Helium 4.002602	Li Lithium 6.94	Be Beryllium 9.0121831	B Boron 10.81	C Carbon 12.011	N Nitrogen 14.007	O Oxygen 15.999	F Fluorine 18.998403163	Ne Neon 20.1797	Na Sodium 22.98976928	Mg Magnesium 24.305	Al Aluminum 26.9815385	Si Silicon 28.0855	P Phosphorus 30.973761998	S Sulfur 32.06	Cl Chlorine 35.45	Ar Argon 39.948		
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Fr Francium (223)	Ra Radium (226)	89 - 103 Actinoids		Rf Rutherfordium (261)	Sg Seaborgium (263)	Bh Bohrium (270)	Hs Hassium (269)	Mt Meitnerium (276)	Ds Darmstadtium (281)	Rg Roentgenium (282)	Cn Copernicium (285)	Nh Nihonium (286)	Fl Flerovium (289)	Mc Moscovium (289)	Lv Livermorium (293)	Ts Tennessine (294)	Og Oganesson (294)		



57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
La Lanthanum 138.90547	Ce Cerium 140.116	Pr Praseodymium 140.90766	Nd Neodymium 144.242	Pm Promethium (145)	Pm Promethium (145)	Sm Samarium 150.36	Eu Europium 151.964	Gd Gadolinium 157.25	Tb Terbium 158.92535	Dy Dysprosium 162.500	Ho Holmium 164.93033	Er Erbium 167.259	Tm Thulium 168.93422	Lu Lutetium 174.9668
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
Ac Actinium (227)	Th Thorium 232.0377	Pa Protactinium 231.03688	U Uranium 238.02891	Np Neptunium (237)	Pu Plutonium (244)	Am Americium (243)	Cm Curium (247)	Bk Berkelium (247)	Cf Californium (251)	Es Einsteinium (252)	Fm Fermium (257)	Md Mendelevium (258)	No Nobelium (259)	Lr Lawrencium (260)

THE PERIODIC TABLE OF ELEMENTS

Periodic Table of the Elements

1 IA	2 IIA											13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA	
1 H Hydrogen 1.008												5 B Boron 10.81	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998403163	10 Ne Neon 20.1797	
	3 Li Lithium 6.94											13 Al Aluminum 26.9815385	14 Si Silicon 28.085	15 P Phosphorus 30.973761998	16 S Sulfur 32.06	17 Cl Chlorine 35.45	18 Ar Argon 39.948	
	11 Na Sodium 22.98976928	12 Mg Magnesium 24.305											31 Ga Gallium 69.723	32 Ge Germanium 72.630	33 As Arsenic 74.921595	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798
	19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955908	22 Ti Titanium 47.887	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938044	26 Fe Iron 55.845	27 Co Cobalt 58.933194	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.38	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.750	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.29
	37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90584	40 Zr Zirconium 91.224	41 Nb Niobium 92.90637	42 Mo Molybdenum 95.95	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.90550	46 Pd Palladium 106.42	47 Ag Silver 107.8682	80 Hg Mercury 200.592	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98040	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
55 Cs Caesium 132.90545196	56 Ba Barium 137.327	57 - 71 Lanthanoids		72 Hf Hafnium 178.49	73 Ta Tantalum 180.94788	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.227	78 Pt Platinum 195.084	79 Au Gold 196.966569	112 Cn Copernicium (285)	113 Nh Nihonium (286)	114 Fl Flerovium (289)	115 Mc Moscovium (289)	116 Lv Livermorium (293)	117 Ts Tennessine (294)	118 Og Oganesson (294)
87 Fr Francium (223)	88 Ra Radium (226)	89 - 103 Actinoids		104 Rf Rutherfordium (267)	105 Db Dubnium (268)	106 Sg Seaborgium (269)	107 Bh Bohrium (270)	108 Hs Hassium (289)	109 Mt Meitnerium (278)	110 Ds Darmstadtium (281)	111 Rg Roentgenium (282)	114 Fl Flerovium (289)	115 Mc Moscovium (289)	116 Lv Livermorium (293)	117 Ts Tennessine (294)	118 Og Oganesson (294)		

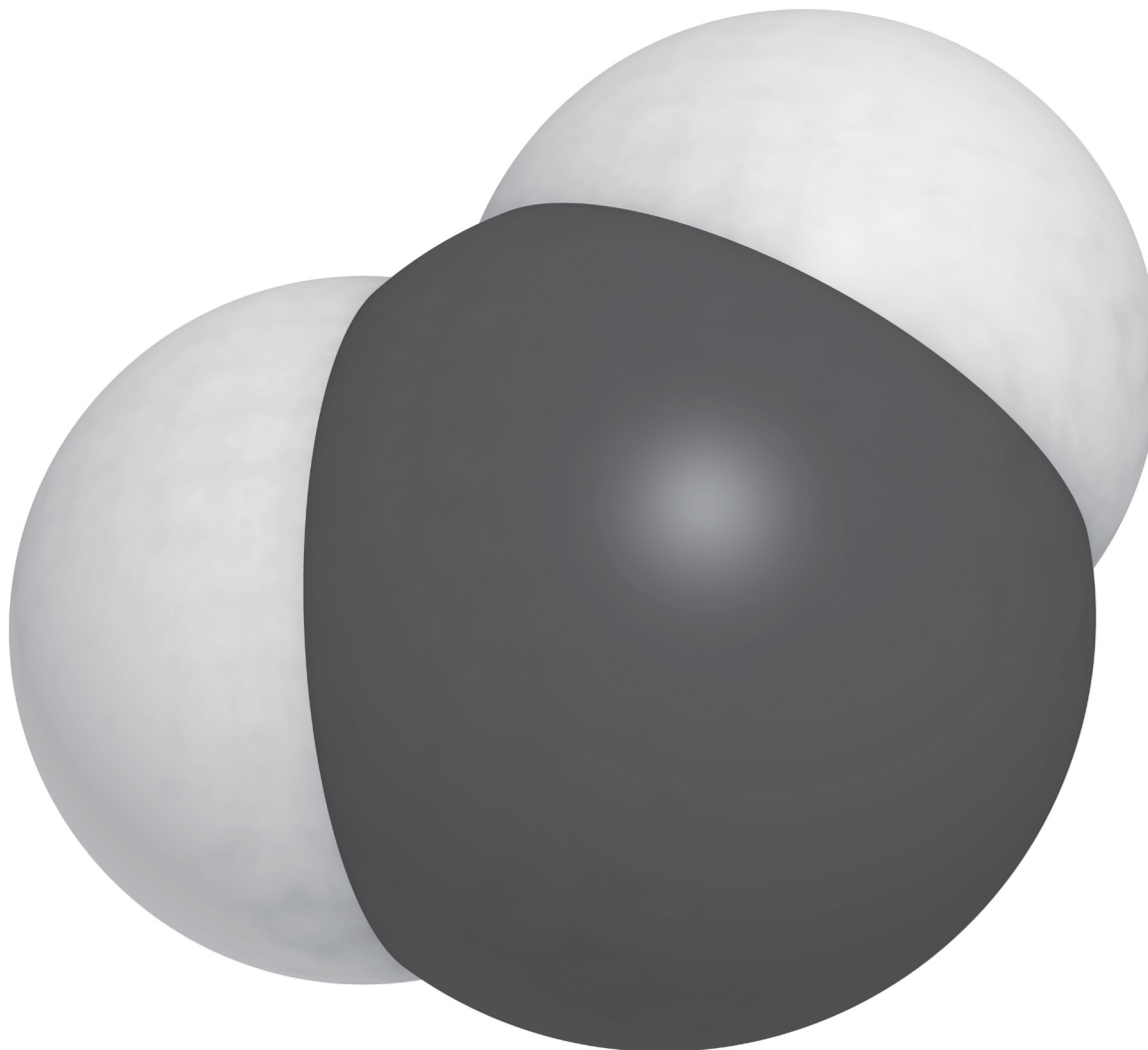


57 La Lanthanum 138.90547	58 Ce Cerium 140.116	59 Pr Praseodymium 140.90766	60 Nd Neodymium 144.242	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92535	66 Dy Dysprosium 162.500	67 Ho Holmium 164.93033	68 Er Erbium 167.259	69 Tm Thulium 168.93422	70 Yb Ytterbium 173.045	71 Lu Lutetium 174.9668
89 Ac Actinium (227)	90 Th Thorium 232.037	91 Pa Protactinium 231.03588	92 U Uranium 238.02891	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (260)

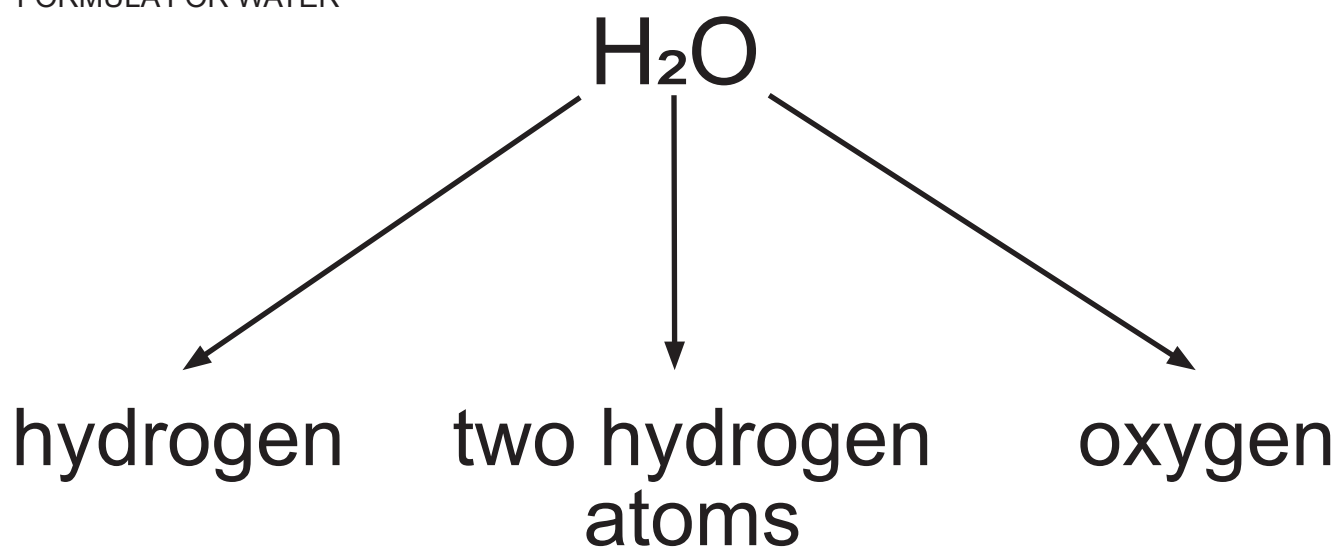
RESOURCE 3

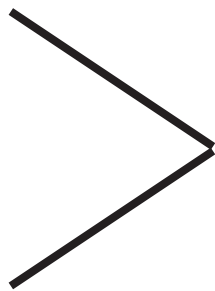
molekuul_be/Shutterstock

MODEL OF WATER MOLECULE & FORMULA FOR WATER



FORMULA FOR WATER





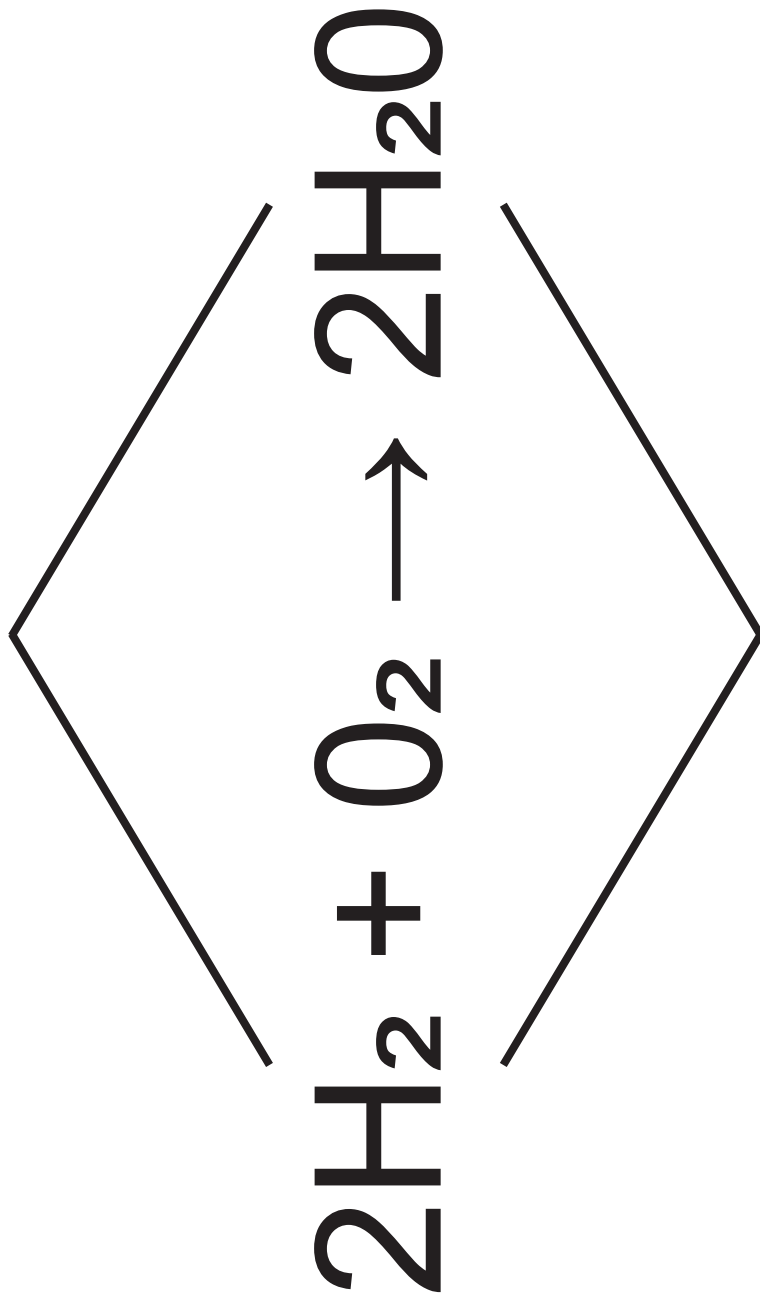
These are the
reactants



This is the
product

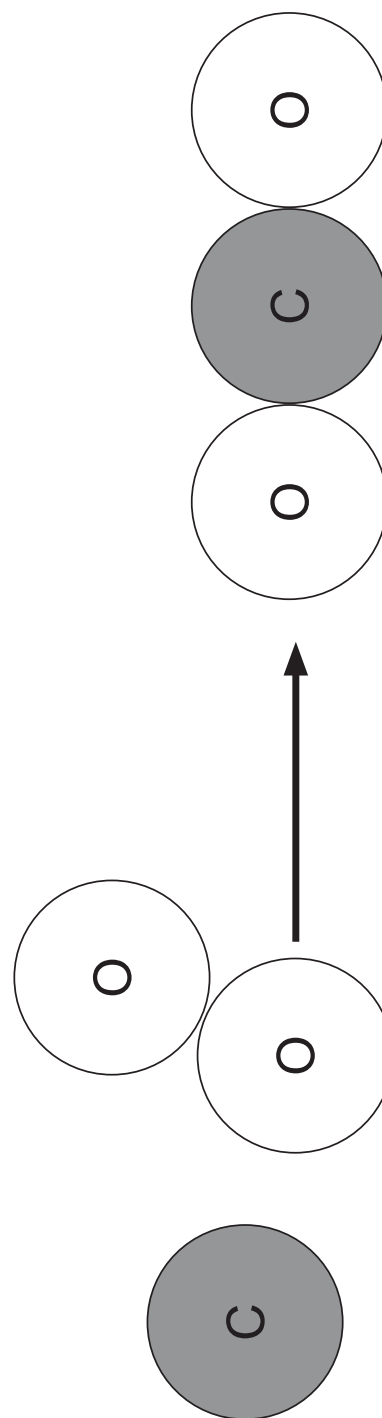
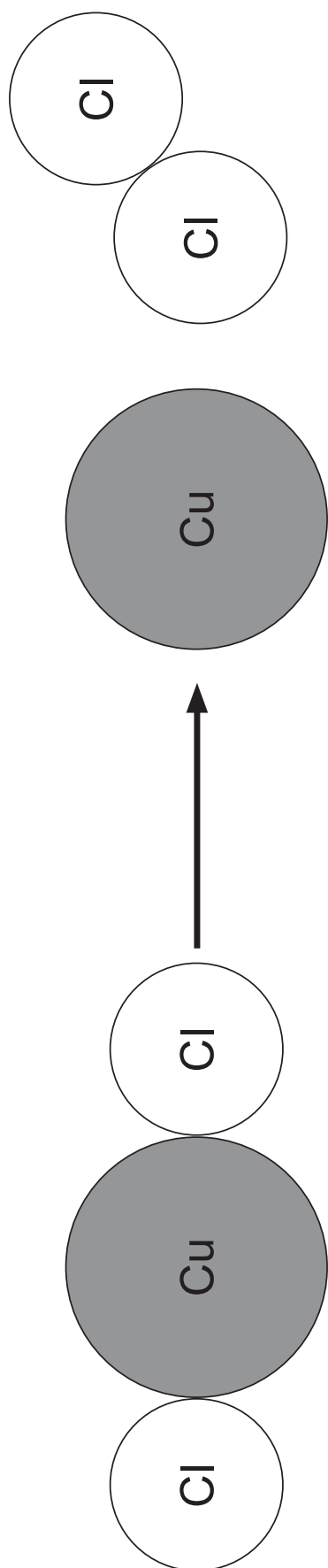
These numbers indicate the ratio in which the molecules react.

In this example, two molecules of hydrogen react with one molecule of oxygen to form two molecules of water.



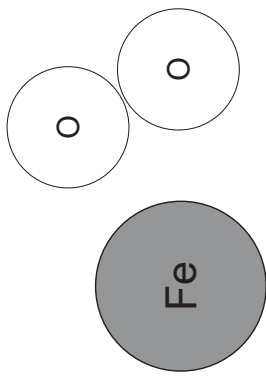
The subscript indicates the number of atoms of an element.

BALANCED CHEMICAL EQUATIONS

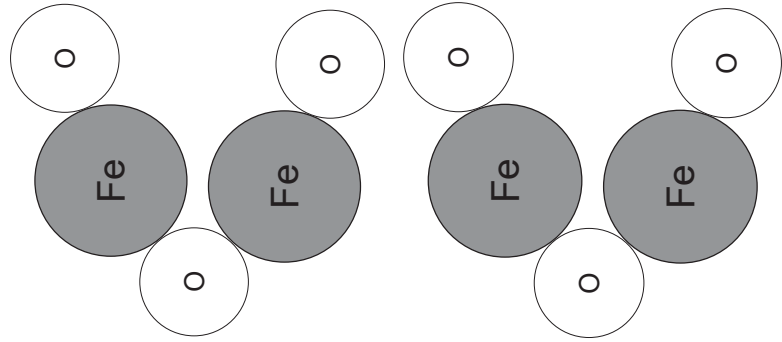
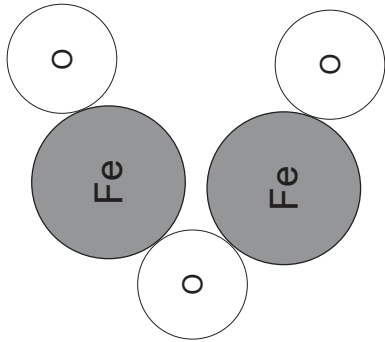
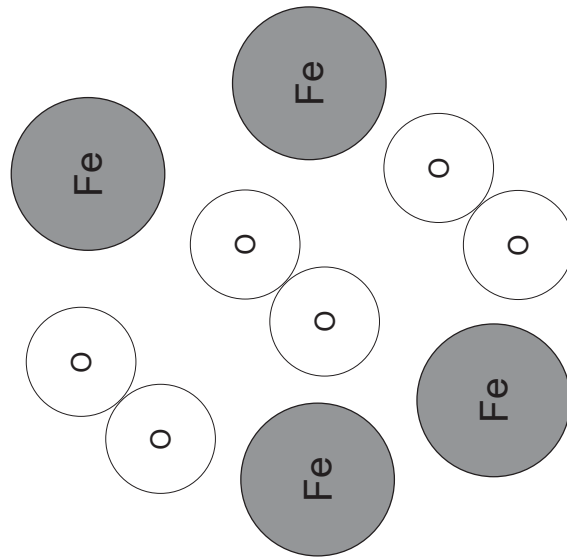


BALANCING THE EQUATION FOR BROWN RUSTY COATING

Unbalanced equation



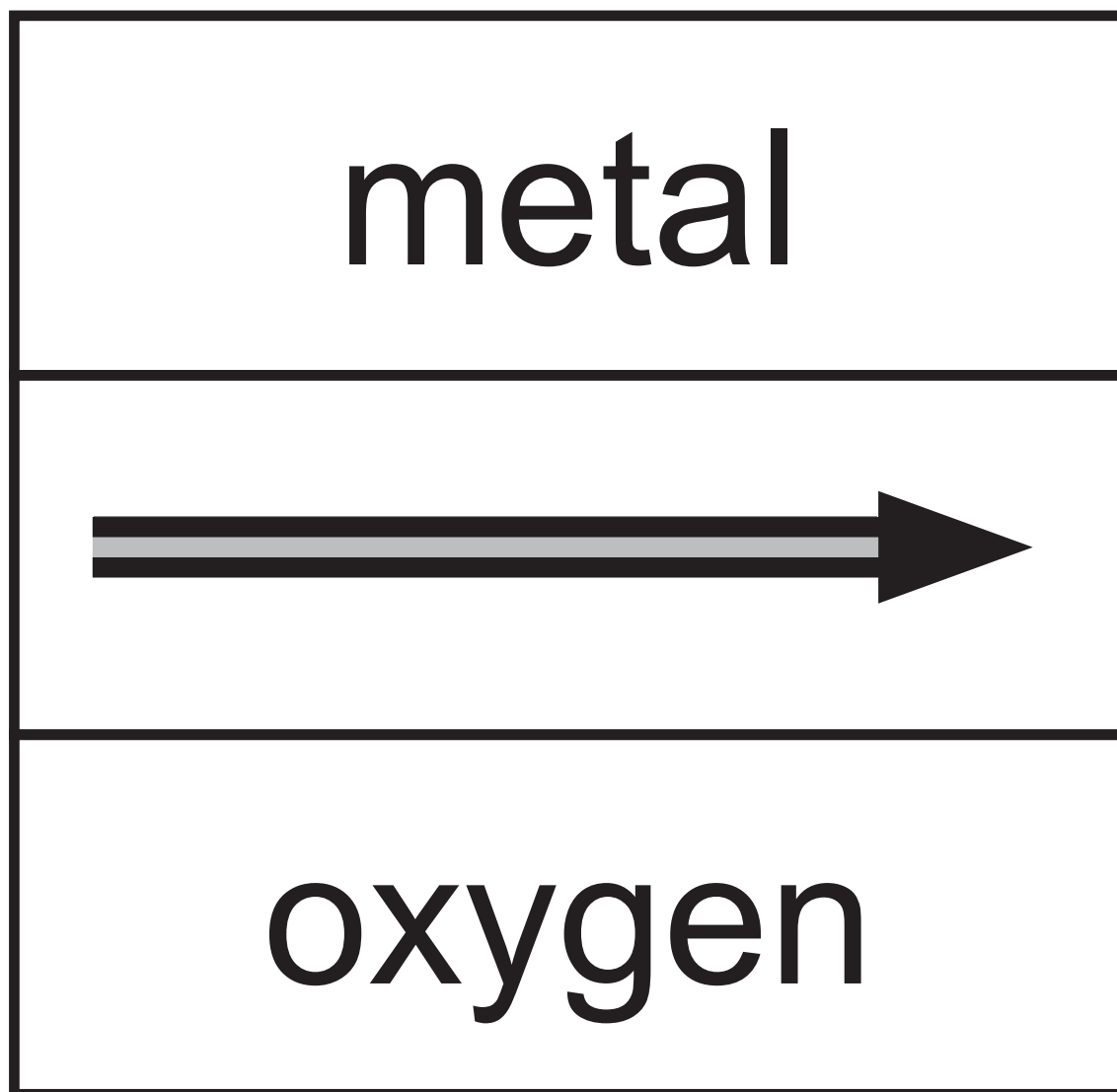
Balanced equation



combustion

oxidation

metal oxide



iron

iron oxide

magnesium

magnesium oxide

RESOURCE 11

DutchScenery/Shutterstock

RUSTED BICYCLE



non-metal

oxygen

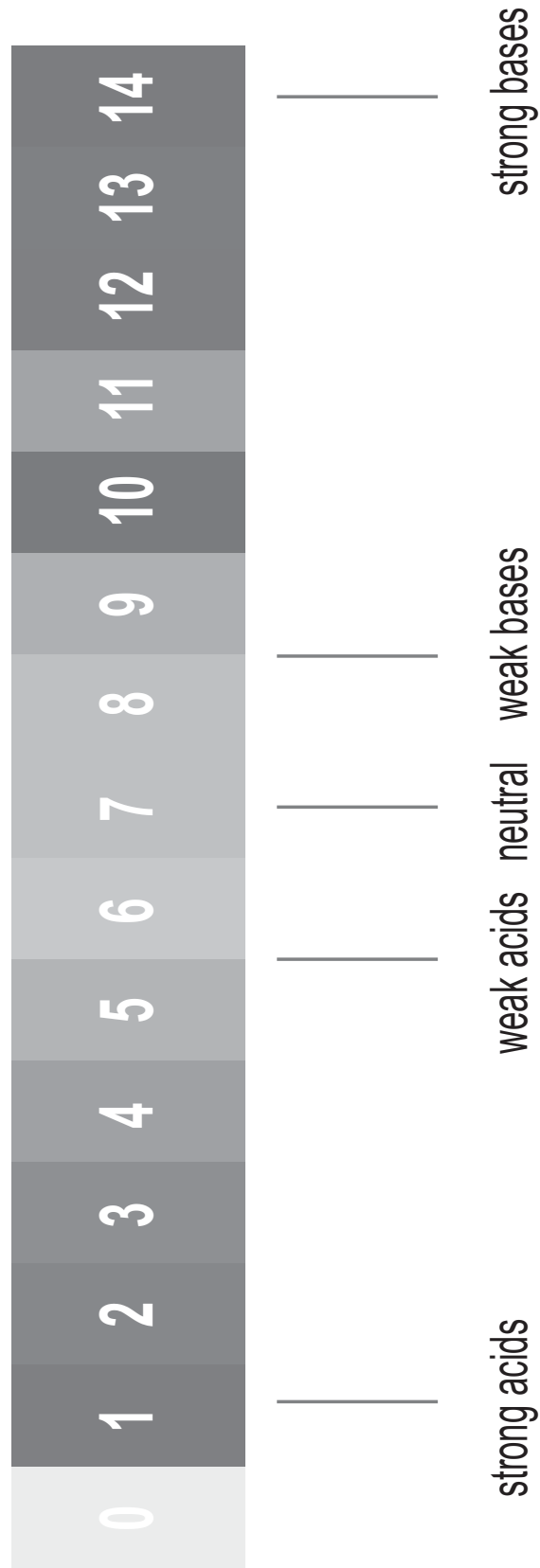
non-metal oxide



RESOURCE 13

Ducu59us/Shutterstock

THE pH SCALE



The pH scale

RESOURCE 14

Chris Hellyar/Shutterstock

EFFECTS OF ACID RAIN



acid

metal hydroxide

salt

water