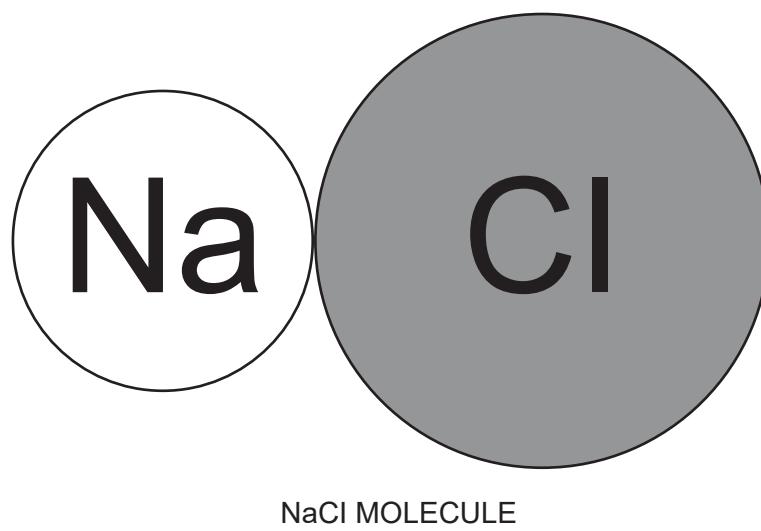
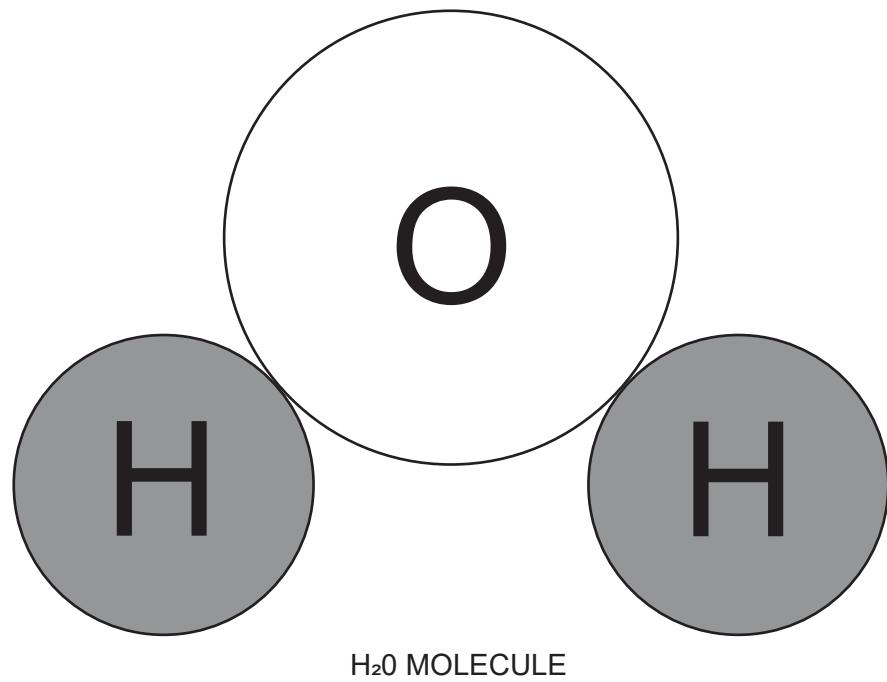


**NATURAL  
SCIENCES**  
**RESOURCE PACK**  
**GRADE 9 TERM 2**



**RESOURCE 1**

**H<sub>2</sub>O MOLECULE & NaCl MOLECULE**



## RESOURCE 2

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### THE PERIODIC TABLE OF ELEMENTS

# Periodic Table of the Elements

Atomic Number →	Symbol	← Name →	Atomic Weight
1	H	Hydrogen	1.008
2	He	Helium	4.02602
3	Li	Lithium	6.94
4	Be	Beryllium	9.0121831
5	Mg	Magnesium	24.305
6	Ca	Scandium	44.955908
7	V	Titanium	47.867
8	Cr	Chromium	51.9861
9	Mn	Manganese	54.938044
10	Fe	Cobalt	55.845
11	Co	Nickel	58.6934
12	Ni	Copper	63.546
13	Zn	Gallium	69.723
14	Al	Germanium	72.630
15	Si	Silicon	28.085
16	P	Phosphorus	30.973761998
17	S	Sulfur	32.06
18	Cl	Chlorine	35.45
19	Ar	Fluorine	18.998403163
20	K	Oxygen	15.999
21	Rb	Neon	20.1797
22	Sr	Neon	20.1797
23	Ca	Neon	20.1797
24	Sc	Neon	20.1797
25	Ti	Neon	20.1797
26	Vb	Neon	20.1797
27	Cr	Neon	20.1797
28	Mn	Neon	20.1797
29	Fe	Neon	20.1797
30	Co	Neon	20.1797
31	Ni	Neon	20.1797
32	Cu	Neon	20.1797
33	Zn	Neon	20.1797
34	Ga	Neon	20.1797
35	Al	Neon	20.1797
36	Si	Neon	20.1797
37	P	Neon	20.1797
38	S	Neon	20.1797
39	Cl	Neon	20.1797
40	Ar	Neon	20.1797
41	K	Neon	20.1797
42	Rb	Neon	20.1797
43	Sr	Neon	20.1797
44	Ca	Neon	20.1797
45	Sc	Neon	20.1797
46	Ti	Neon	20.1797
47	Vb	Neon	20.1797
48	Cr	Neon	20.1797
49	Mn	Neon	20.1797
50	Fe	Neon	20.1797
51	Co	Neon	20.1797
52	Ni	Neon	20.1797
53	Cu	Neon	20.1797
54	Zn	Neon	20.1797
55	Ga	Neon	20.1797
56	Al	Neon	20.1797
57	Si	Neon	20.1797
58	P	Neon	20.1797
59	S	Neon	20.1797
60	Cl	Neon	20.1797
61	Ar	Neon	20.1797
62	K	Neon	20.1797
63	Rb	Neon	20.1797
64	Sr	Neon	20.1797
65	Ca	Neon	20.1797
66	Sc	Neon	20.1797
67	Ti	Neon	20.1797
68	Vb	Neon	20.1797
69	Cr	Neon	20.1797
70	Mn	Neon	20.1797
71	Fe	Neon	20.1797
72	Co	Neon	20.1797
73	Ni	Neon	20.1797
74	Cu	Neon	20.1797
75	Zn	Neon	20.1797
76	Ga	Neon	20.1797
77	Al	Neon	20.1797
78	Si	Neon	20.1797
79	P	Neon	20.1797
80	S	Neon	20.1797
81	Cl	Neon	20.1797
82	Ar	Neon	20.1797
83	K	Neon	20.1797
84	Rb	Neon	20.1797
85	Sr	Neon	20.1797
86	Ca	Neon	20.1797
87	Sc	Neon	20.1797
88	Ti	Neon	20.1797
89	Vb	Neon	20.1797
90	Cr	Neon	20.1797
91	Mn	Neon	20.1797
92	Fe	Neon	20.1797
93	Co	Neon	20.1797
94	Ni	Neon	20.1797
95	Cu	Neon	20.1797
96	Zn	Neon	20.1797
97	Ga	Neon	20.1797
98	Al	Neon	20.1797
99	Si	Neon	20.1797
100	P	Neon	20.1797
101	S	Neon	20.1797
102	Cl	Neon	20.1797
103	Ar	Neon	20.1797

18 VIIIA	2 He	3 B	4 C	5 N	6 O	7 F	8 Ne
1	H	Boron	Carbon	Nitrogen	Oxygen	Fluorine	Neon
2	He	10.81	12.011	14.007	15.999	18.998403163	20.1797
3	Li	Hydrogen	Beryllium	Boron	Carbon	Fluorine	Neon
4	Be	1.008	9.0121831	10.81	12.011	18.998403163	20.1797
5	Mg	Magnesium	Calcium	Neon	Fluorine	Neon	Neon
6	Ca	Scandium	Yttrium	Fluorine	Neon	Fluorine	Neon
7	Sc	Titanium	Zirconium	Neon	Fluorine	Neon	Neon
8	Ti	Vanadium	Iron	Neon	Fluorine	Neon	Neon
9	Vb	Chromium	Manganese	Neon	Fluorine	Neon	Neon
10	Cr	Manganese	Iron	Neon	Fluorine	Neon	Neon
11	Mn	Iron	Cobalt	Neon	Fluorine	Neon	Neon
12	Zr	Cobalt	Ruthenium	Neon	Fluorine	Neon	Neon
13	Nb	Ruthenium	Palladium	Neon	Fluorine	Neon	Neon
14	Hf	Palladium	Rhodium	Neon	Fluorine	Neon	Neon
15	Ta	Rhodium	Rhenium	Neon	Fluorine	Neon	Neon
16	W	Rhenium	Tungsten	Neon	Fluorine	Neon	Neon
17	Re	Tungsten	Rhenium	Neon	Fluorine	Neon	Neon
18	Os	Rhenium	Osmium	Neon	Fluorine	Neon	Neon
19	Ru	Osmium	Iridium	Neon	Fluorine	Neon	Neon
20	Rh	Iridium	Palladium	Neon	Fluorine	Neon	Neon
21	Dubnium	Palladium	Ruthenium	Neon	Fluorine	Neon	Neon
22	Rutherfordium	Ruthenium	Dubnium	Neon	Fluorine	Neon	Neon
23	Rutherfordium	Dubnium	Rutherfordium	Neon	Fluorine	Neon	Neon
24	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
25	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
26	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
27	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
28	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
29	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
30	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
31	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
32	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
33	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
34	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
35	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
36	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
37	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
38	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
39	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
40	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
41	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
42	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
43	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
44	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
45	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
46	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
47	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
48	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
49	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
50	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
51	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
52	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
53	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
54	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
55	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
56	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
57	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
58	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
59	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
60	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
61	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
62	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
63	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
64	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
65	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
66	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
67	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
68	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
69	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
70	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon
71	Rutherfordium	Rutherfordium	Rutherfordium	Neon	Fluorine	Neon	Neon

57	La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
57	Lanthanum	Praseodymium	Neodymium	Promethium	Europium	Samarium	Europium	Gadolinium	Terbium	Dysprosium	Holmium	Erbium	Thulium	Ytterbium	Lutetium
58	Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr
59	Actinium	Thorium	Protactinium	Uranium	Neptunium	Plutonium	Americium	Curium	Berkelium	Californium	Einsteinium	Fermium	Mendelevium	Nobelium	Lawrencium
60	(227)	(232)	(231)	(230)	(237)	(244)	(243)	(247)	(247)	(252)	(252)	(257)	(257)	(258)	(266)

# Periodic Table of the Elements

## RESOURCE 2

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# THE PERIODIC TABLE OF ELEMENTS

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8	Ti	Titanium 47.867
9	V	Vanadium 50.945
10	Cr	Chromium 51.9961
11	Mn	Manganese 54.938044
12	Fe	Iron 55.845
13	Co	Cobalt 58.93194
14	Ni	Nickel 58.6934
15	Cu	Copper 63.546
16	Zn	Zinc 65.38
17	Ga	Gallium 69.723
18	Ge	Germanium 72.630
19	Al	Aluminum 26.9815385
20	Si	Silicon 28.085
21	P	Phosphorus 30.97276988
22	S	Sulfur 32.06
23	Cl	Chlorine 35.45
24	Ar	Argon 39.948
25	Br	Bromine 79.904
26	Kr	Krypton 83.798
27	Xe	Xenon 131.293
28	Rb	Rubidium 85.4678
29	Sr	Strontrium 87.62
30	Y	Yttrium 88.90584
31	Sc	Zirconium 91.224
32	Ti	Titanium 92.90637
33	Nb	Niobium 95.95
34	Mo	Molybdenum 95.96
35	Tc	Technetium 98
36	Ru	Ruthenium 101.07
37	Rh	Rhodium 102.90550
38	Pd	Palladium 106.42
39	Ag	Argentum 107.8682
40	Cd	Cadmium 112.414
41	In	Indium 114.818
42	Sn	Tin 118.710
43	Ge	Germanium 118.710
44	Ge	Gallium 118.710
45	Rh	Rhodium 118.710
46	Pt	Palladium 118.710
47	Ir	Iridium 118.710
48	Os	Osmium 118.710
49	Hg	Mercury 118.710
50	Pb	Lead 118.710
51	Bi	Bismuth 118.710
52	Te	Tellurium 127.60
53	I	Iodine 126.90447
54	Xe	Xenon 131.293
55	Cs	Caesium 132.9054596
56	Ba	Barium 137.327
57	Hf	Hafnium 178.49
58	Ta	Tantalum 180.978
59	W	Tungsten 183.84
60	Re	Rhenium 186.207
61	Os	Osmium 190.23
62	Pt	Iridium 192.217
63	Ru	Ruthenium 195.084
64	Ds	Dysprosium 198.96669
65	Mt	Muttrium 200.892
66	Dy	Dysprosium 202.217
67	Tb	Terbium 204.38
68	Ho	Holmium 207.222
69	Er	Erbium 208.96040
70	Tm	Thulium 209.93422
71	Yb	Ytterbium 210.93422
72	Lu	Lutetium 214.93668
73	La	Lanthanum 138.90547
74	Ce	Cerium 140.116
75	Pr	Praseodymium 140.90766
76	Nd	Neodymium 144.242
77	Pm	Promethium 145
78	Sm	Samarium 150.36
79	Eu	Europium 151.964
80	Gd	Gadolinium 157.255
81	Tb	Terbium 158.92555
82	Dy	Dysprosium 162.500
83	Ho	Holmium 164.93033
84	Er	Erbium 167.239
85	Tm	Thulium 168.93422
86	Yb	Ytterbium 170.93422
87	Fr	Francium 223
88	Ra	Radium 226
89	Ac	Actinium 227
90	Th	Thorium 232.0377
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	Curium 251
99	Fm	Fermium 257
100	Es	Einsteinium 252
101	Md	Mendelevium 258
102	No	Nobelium 259
103	Lr	Lawrencium 266

57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu
89	Ac	90	Th	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Fm	100	Es	101	Md	102	No	103	Lr
90	Th	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Fm	100	Es	101	Md	102	No	103	Lr		

## RESOURCE 2

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### THE PERIODIC TABLE OF ELEMENTS

# Periodic Table of the Elements

Atomic Number →	Symbol	Atomic Weight ↓
1	H	Hydrogen 1.008
2	Be	Boron 9.01831
3	Li	Lithium 6.94
4	Mg	Magnesium 24.305
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6	Sc	Scandium 44.95908
7	Ti	Titanium 47.867
8	V	Vanadium 50.945
9	Cr	Chromium 51.9961
10	Mn	Manganese 54.938044
11	Fe	Iron 55.845
12	Co	Cobalt 58.93194
13	Ni	Nickel 58.6934
14	Cu	Copper 63.546
15	Zn	Zinc 65.38
16	Ga	Gallium 69.723
17	Ge	Germanium 72.630
18	As	Arsenic 74.92195
19	Al	Aluminum 26.9815385
20	Si	Silicon 28.085
21	P	Phosphorus 30.9727998
22	Cl	Sulfur 32.06
23	Ar	Chlorine 35.45
24	Ne	Fluorine 18.9940333
25	Kr	Neon 20.1797
26	He	Helium 4.002602
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37	Rb	Rubidium 85.4678
38	Sr	Strontrium 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	Argentum 107.86362
48	Cd	Silver 112.414
49	In	Cadmium 112.414
50	Sn	Tin 118.710
51	Sb	Antimony 114.818
52	Te	Antimony 118.710
53	I	Tellurium 126.90447
54	Xe	Iodine 131.293
55	Cs	Cesium 132.9054596
56	Ba	Barium 137.327
57 - 71	Lanthanoids	Lanthanum 138.90547
72	Hf	Hafnium 178.49
73	Ta	Tantalum 180.978
74	W	Tungsten 183.84
75	Re	Rhenium 186.207
76	Os	Osmium 190.23
77	Ir	Iridium 192.217
78	Pt	Platinum 195.98669
79	Au	Gold 196.98669
80	Hg	Silver 197.694
81	Tl	Mercury 204.38
82	Pb	Lead 202.272
83	Bi	Erbium 202.989040
84	Po	Poisonium (209)
85	At	Polonium (209)
86	Rn	Radon (222)
87	Fr	Francium (223)
88	Ra	Radium (226)
89 - 103	Actinoids	Actinium (227)
104	Rf	Rutherfordium (267)
105	Db	Dubnium (268)
106	Sg	Seaborgium (269)
107	Bh	Bohrium (270)
108	Hs	Hassium (269)
109	Mt	Meltnerium (281)
110	Ds	Darmstadtium (282)
111	Rg	Roentgenium (285)
112	Cn	Copernicium (286)
113	Nh	Nihonium (286)
114	Fm	Flerovium (289)
115	Mc	Moscovium (289)
116	Lv	Livermorium (293)
117	Ts	Tennessee (294)
118	Og	Oganesson (294)

57	La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
57	Lanthanum 138.90547	Cerium 140.918	Praseodymium 140.9766	Neodymium 144.242	Promethium (145)	Samarium 150.36	Europium 151.964	Gadolinium 157.25	Terbium 158.9255	Dysprosium 162.500	Hholmium 164.93033	Erbium 167.259	Thulium 168.93422	Ytterbium 173.045	Lutetium 174.93668
89	Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

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9	V	Vanadium 50.945
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11	Mn	Manganese 54.938044
12	Fe	Iron 55.845
13	Co	Cobalt 58.93194
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15	Cu	Copper 63.546
16	Zn	Zinc 65.38
17	Ga	Gallium 69.723
18	Ge	Germanium 72.630
19	Al	Aluminum 26.9815385
20	Si	Silicon 28.085
21	P	Phosphorus 30.97276988
22	Cl	Chlorine 35.45
23	Ar	Argon 39.948
24	S	Sulfur 32.06
25	O	Oxygen 16.000
26	F	Fluorine 18.998403133
27	N	Nitrogen 14.007
28	P	Phosphorus 30.97276988
29	S	Sulfur 32.06
30	As	Arsenic 74.9219595
31	Se	Selenium 78.971
32	Br	Bromine 79.904
33	Kr	Krypton 83.798
34	Te	Te
35	Xe	Xenon 131.293
36	I	Iodine 126.90447
37	Rb	Rubidium 85.4678
38	Sr	Strontrium 87.62
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45	Rh	Rhodium 102.90560
46	Pd	Palladium 106.42
47	Ag	Silver 107.8682
48	Cd	Cadmium 112.414
49	In	Inium 114.818
50	Sn	Tin 118.710
51	Sb	Sb
52	Te	Te
53	I	I
54	Xe	Xe
55	Cs	Caesium 132.9054596
56	Ba	Barium 137.327
57 - 71	Hf	Hafnium 178.49
72	Ta	Tantalum 180.978
73	W	Tungsten 183.84
74	Re	Rhenium 186.207
75	Ir	Iridium 182.217
76	Os	Osmium 190.23
77	Pt	Platinum 195.084
78	Au	Gold 196.96669
79	Hg	Mercury 200.592
80	Tl	Thallium 204.38
81	Pb	Pb
82	Bi	Bismuth 207.22
83	Po	Po
84	At	At
85	Rn	Rn
86	Atmospheric Radon (222)	Atmospheric Radon (222)
87	Fr	Francium (223)
88	Ra	Radium (226)
89 - 103	Actinoids	Actinoids (227)
104	Rf	Rutherfordium (267)
105	Db	Dubnium (268)
106	Sg	Seaborgium (269)
107	Bh	Bohrium (270)
108	Hs	Hassium (269)
109	Mt	Methylmercury (269)
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	Tennessee (294)
118	Og	Oganesson (284)

57	La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
57	Lanthanum 138.90547	Cerium 140.116	Praseodymium 140.9766	Neodymium 144.242	Promethium 145	Samarium 150.36	Europerium 151.964	Gadolinium 157.25	Terbium 158.92556	Dysprosium 162.500	Holmium 164.93033	Erbium 167.259	Thulium 168.93422	Ytterbium 170.045	Lutetium 174.93668
89	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	99	100	101	102	103
90	Thorium 232.0377	Proactinium 231.03588	Uranium 238.02891	Neptunium 237	Plutonium 244	Americium 243	Curium 247	Berkelium 247	Californium 251	Einsteinium 252	Fermium 257	Mendelevium 258	Nobelium 259	Lawrencium 266	

## RESOURCE 2

Humdan/Shutterstock

### THE PERIODIC TABLE OF ELEMENTS

# Periodic Table of the Elements

1 IA		2 IIA																										
1	H	Hydrogen 1.008	2	Be	Boron 9.01831																							
3	Li	Lithium 6.94	4																									
11	Na	Magnesium 24.305	12	Mg	Scandium 44.95908	21	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr						
19	K	Calcium 40.078	20	Ca	Scandium 44.95908	39	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe						
37	Rb	Strontium 87.62	38	Sr	Yttrium 88.90584	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56						
55	Cs	Rubidium 88.4678	56	Ba	Zirconium 91.224	57 - 71	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	Radon (222)						
87	Fr	Francium (223)	88	Ra	Barium 137.327	89 - 103	Rf	Dubnium (267)	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fm	Mc	Lv	Ts	Og	Oganesson (284)						
57	La	Lanthanum 138.90547	58	Ce	Praseodymium 140.91766	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	Ho	Er	Tm	Yb	Lu		
89	Ac	Actinium (227)	90	Th	Thorium 232.0377	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	100	Fm	Md	No	Lr	Lutetium 174.9668

57	La	Cerium 140.91766	58	Ce	Praseodymium 140.91766	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	Ho	Er	Tm	Yb	Lu	
89	Ac	Actinium (227)	90	Th	Thorium 232.0377	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	100	Fm	Md	No	Lr

## RESOURCE 2

Humdan/Shutterstock

### THE PERIODIC TABLE OF ELEMENTS

# Periodic Table of the Elements

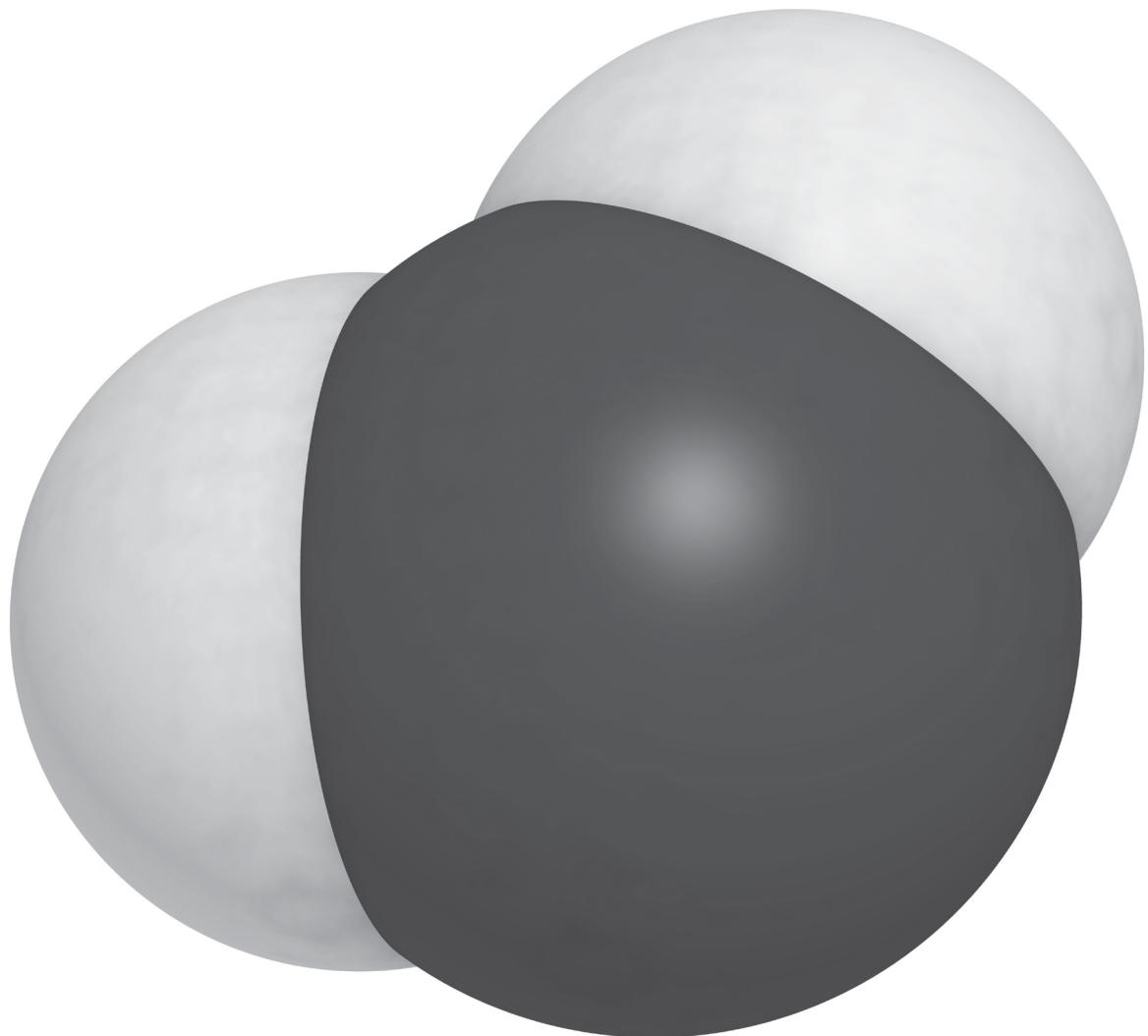
Atomic Number →	Symbol	→ Atomic Weight
1	H	Hydrogen 1.008
2	He	Helium 4.002602
3	Li	Lithium 6.94
4	Be	Beryllium 9.0121831
5	Mg	Magnesium 24.305
6	Ca	Calcium 40.078
7	Sc	Scandium 44.95908
8	Ti	Titanium 47.867
9	V	Vanadium 50.945
10	Cr	Chromium 51.9961
11	Mn	Manganese 54.938044
12	Fe	Iron 55.845
13	Co	Cobalt 58.93194
14	Ni	Nickel 58.6934
15	Cu	Copper 63.546
16	Zn	Zinc 65.38
17	Ga	Gallium 69.723
18	Ge	Germanium 72.630
19	Al	Aluminum 26.9815385
20	Si	Silicon 28.085
21	P	Phosphorus 30.97276198
22	S	Sulfur 32.06
23	Cl	Chlorine 35.45
24	O	Oxygen 16.000
25	F	Fluorine 18.998403133
26	N	Nitrogen 14.007
27	P	Hydrogen 1.008
28	Ge	Germanium 78.971
29	As	Arsenic 74.92195
30	Se	Selenium 78.971
31	Br	Bromine 79.904
32	Kr	Krypton 83.798
33	Ar	Argon 39.948
34	Ne	Neon 20.1797
35	Br	Fluorine 18.998403133
36	Kr	Krypton 83.798
37	Rb	Rubidium 85.4678
38	Sr	Strontrium 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	Inium 114.818
50	Sn	Tin 118.710
51	Sb	Selenium 121.760
52	Te	Tellurium 127.660
53	I	Iodine 126.90447
54	Xe	Xenon 131.293
55	Cs	Caesium 132.9054596
56	Ba	Barium 137.327
57	Hf	Hafnium 178.49
58	Ta	Tantalum 180.9778
59	W	Tungsten 183.84
60	Re	Rhenium 186.207
61	Pm	Ruthenium 192.217
62	Sm	Osmium 190.23
63	Eu	Platinum 195.084
64	Gd	Gold 196.96669
65	Tb	Mercury 200.692
66	Dy	Palladium 202.272
67	Ho	Thallium 204.38
68	Er	Bismuth 208.98040
69	Tm	Lead 202.722
70	Yb	Polonium 209.000
71	Lu	Atmospheric 210.000
72	Fr	Radium 226
73	Ra	Actinoids 227
74	Bh	Rutherfordium 267
75	Sg	Dubnium 268
76	Ds	Bohrium 269
77	Rg	Seaborgium 269
78	Hs	Hassium 269
79	Mt	Methylmercury 269
80	Rg	Darmstadtium 281
81	Cn	Copernicium 285
82	Nh	Roentgenium 285
83	Pb	Flerovium 286
84	Tl	Nihonium 286
85	Bi	Moscovium 289
86	Po	Livermorium 289
87	Ra	Tennessee 294
88	Ra	Oganesson 284
89	Fr	Francium 223

57	La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
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89	Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr
90	Actinium 227	Thorium 232.0377	Proactinium 231.03588	Uranium 238.02891	Neptunium 237	Plutonium 244	Americium 243	Curium 247	Berkelium 247	Californium 251	Einsteinium 252	Fermium 257	Mendelevium 258	Nobelium 259	Lawrencium 266

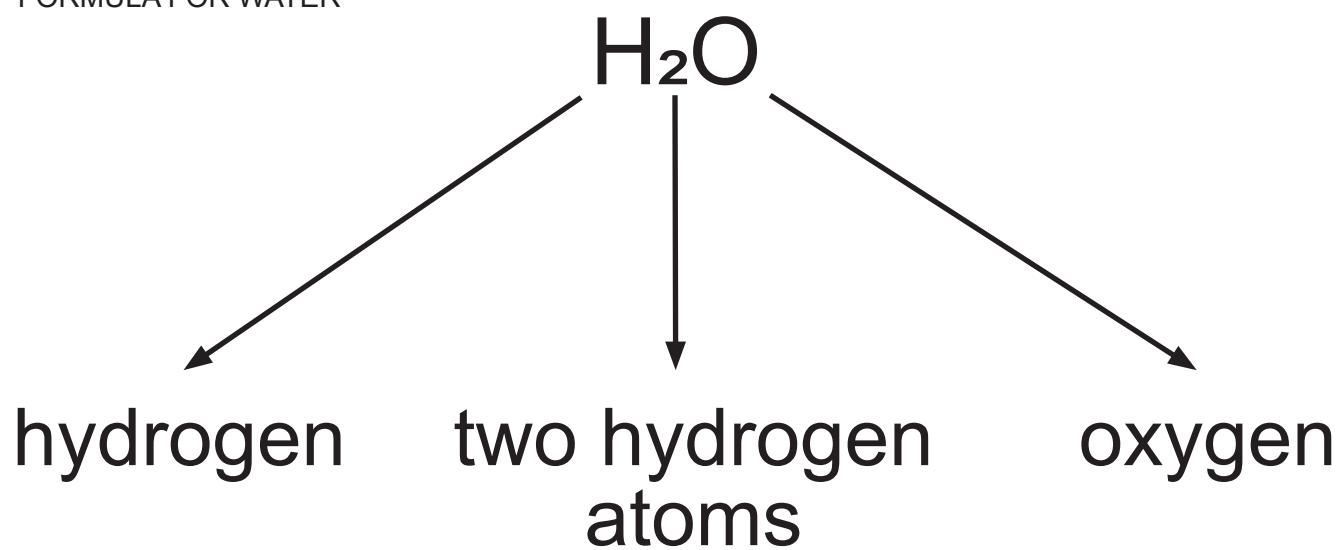
## RESOURCE 3

molekuul\_be/Shutterstock

### MODEL OF WATER MOLECULE & FORMULA FOR WATER

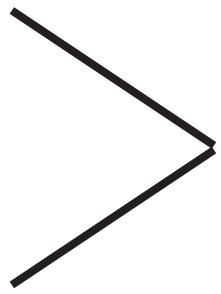


FORMULA FOR WATER



## RESOURCE 4

### REACTANTS AND PRODUCTS



These are the  
reactants

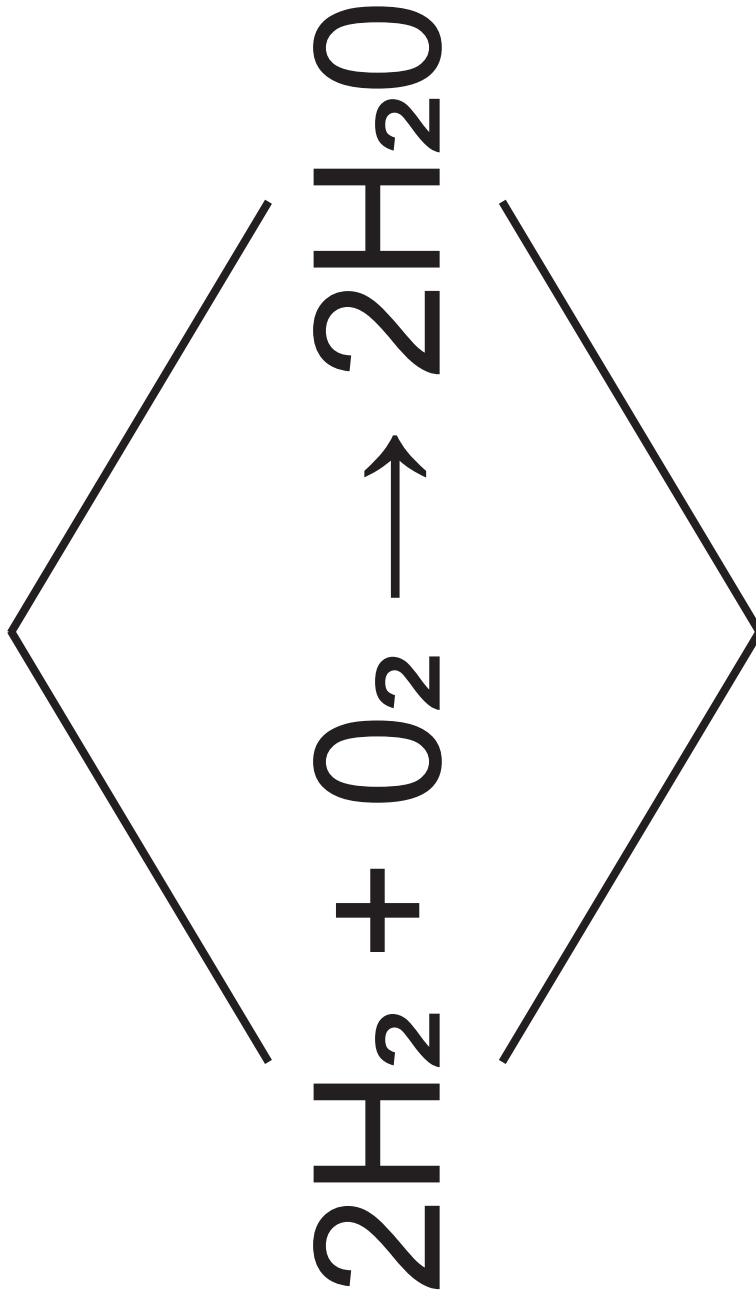


This is the  
product

## RESOURCE 5

### WHAT DO NUMBERS TELL US?

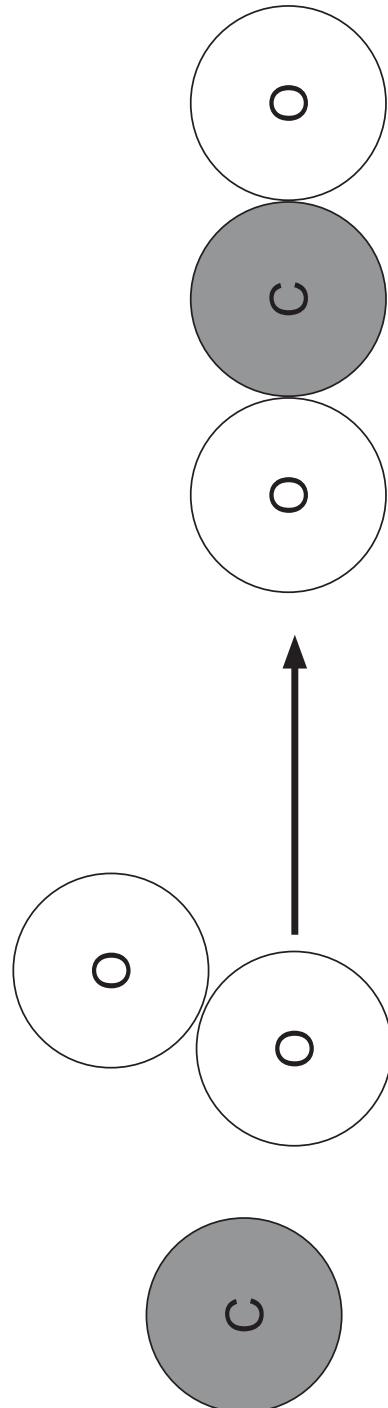
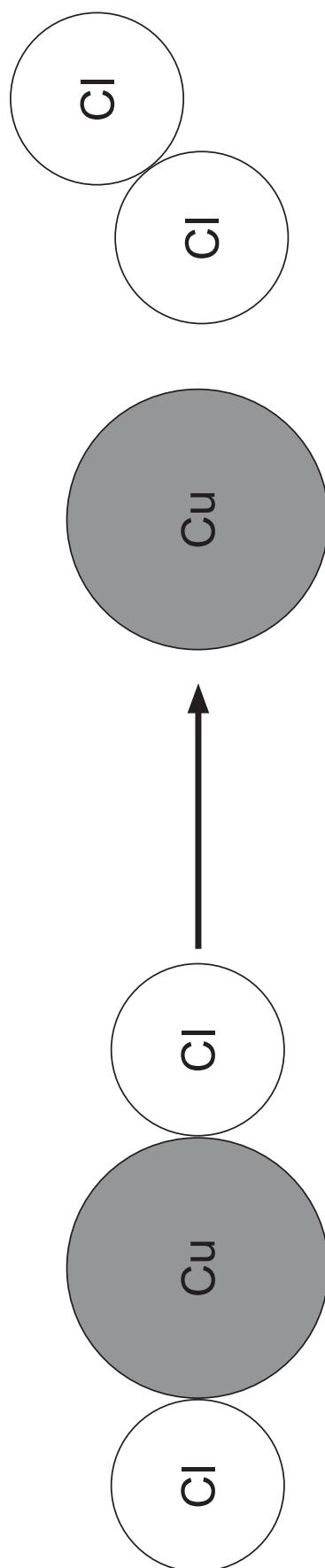
These numbers indicate the ratio in which the molecules react.  
In this example, two molecules of hydrogen react with one molecule of oxygen to form two molecules of water.



The subscript indicates the number of atoms of an element.

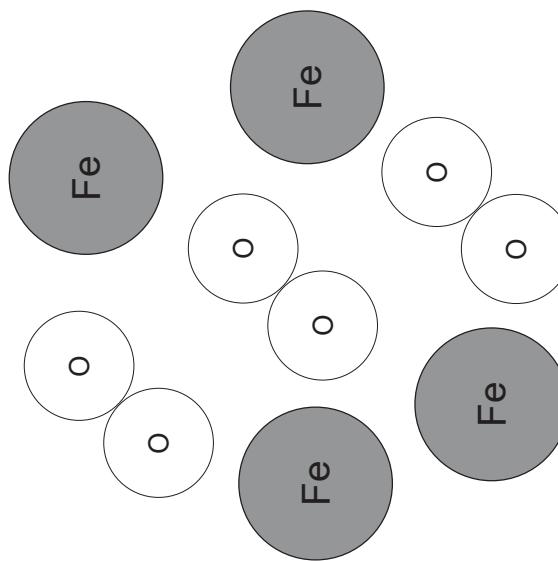
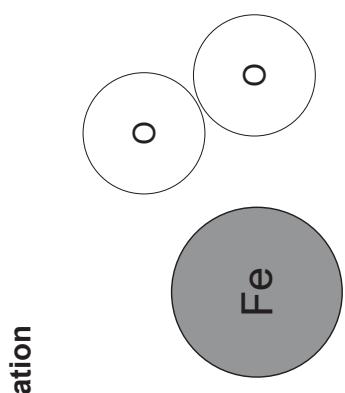
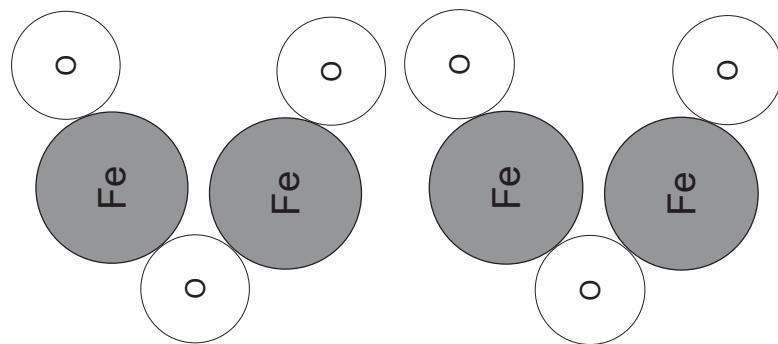
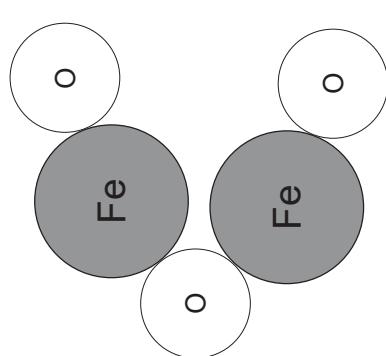
## RESOURCE 6

### BALANCED CHEMICAL EQUATIONS



## RESOURCE 7

### BALANCING THE EQUATION FOR BROWN RUSTY COATING



**RESOURCE 8**

**GENERAL REACTION OF A METAL WITH OXYGEN**

**combustion**

**oxidation**

**metal oxide**

## RESOURCE 9

### GENERAL REACTION OF A METAL WITH OXYGEN

metal



oxygen

RESOURCE 10

GENERAL REACTION OF A METAL WITH OXYGEN

iron

iron oxide

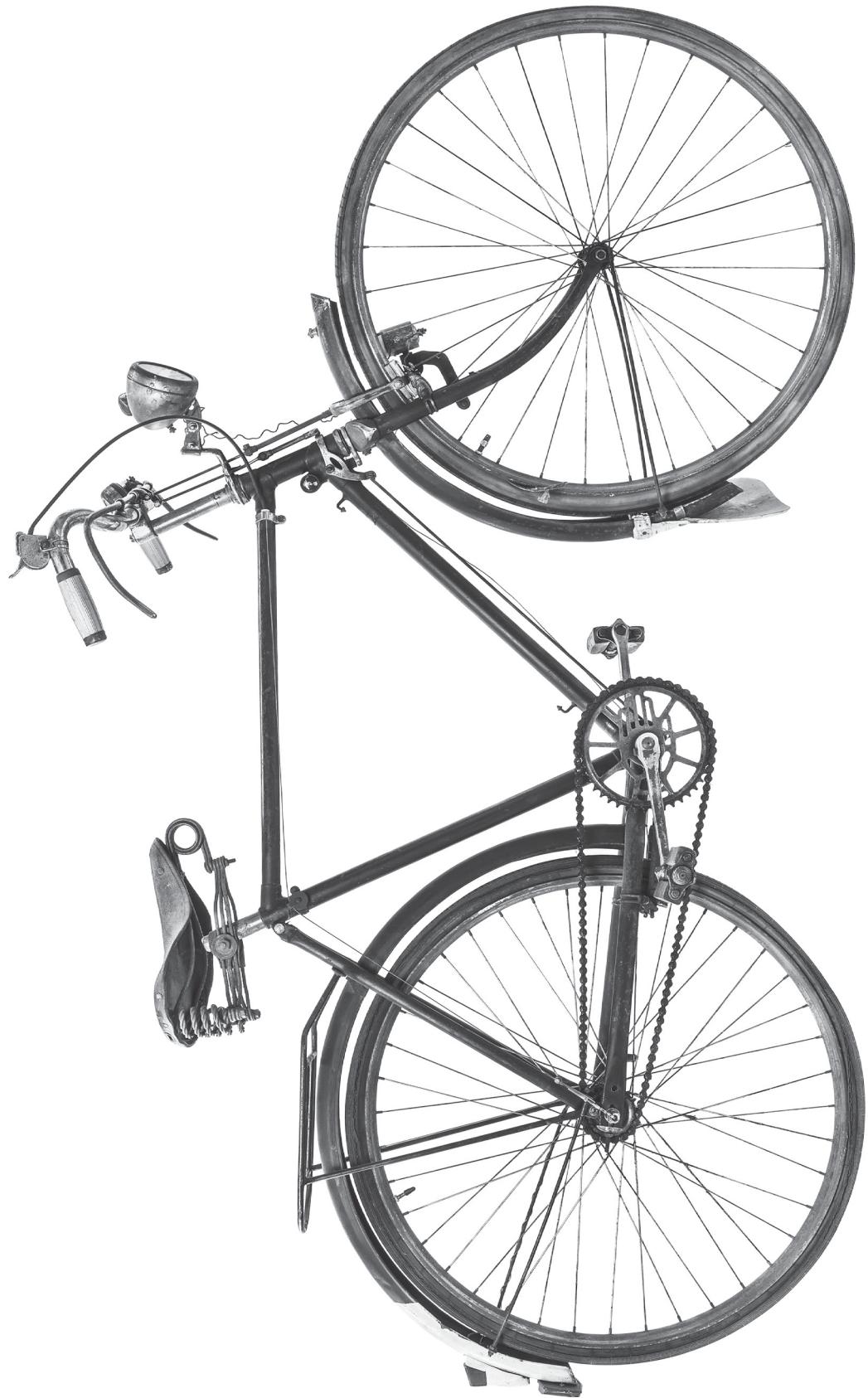
magnesium

magnesium oxide

## RESOURCE 11

DutchScenery/Shutterstock

### RUSTED BICYCLE



**RESOURCE 12**

**REACTION OF A NON-METAL WITH OXYGEN**

**non-metal**

**oxygen**

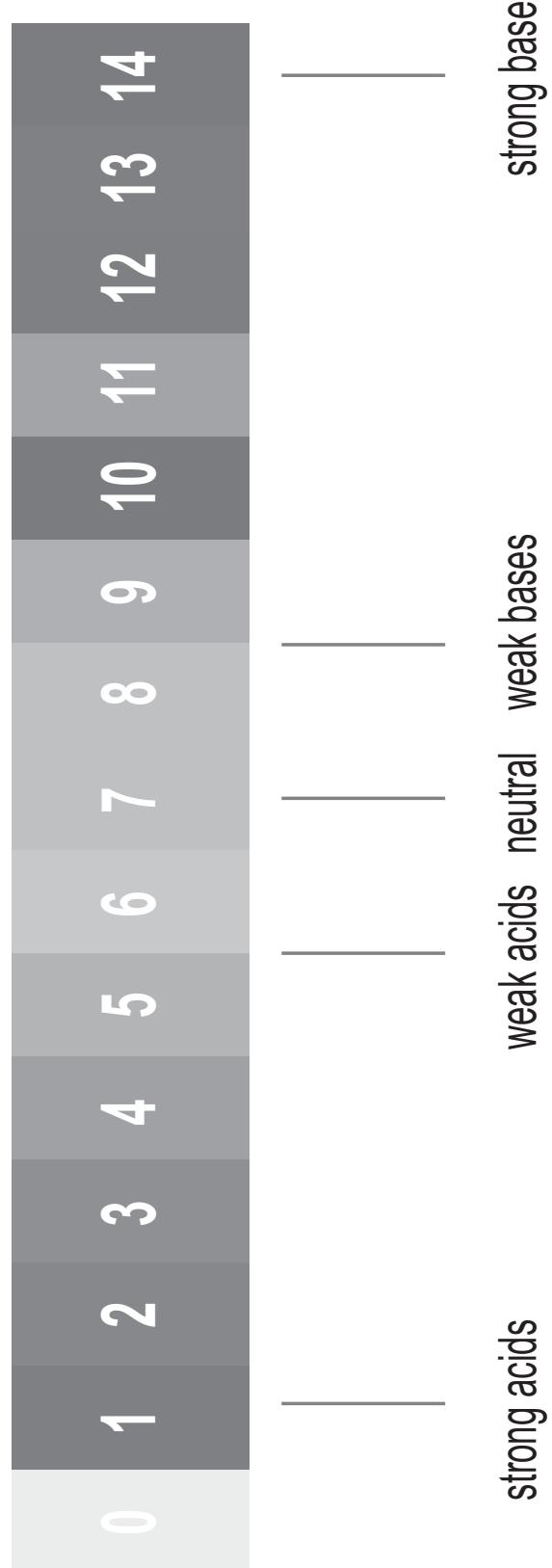
**non-metal oxide**



## RESOURCE 13

Ducu59us/Shutterstock

### THE pH SCALE



The pH scale

## RESOURCE 14

Chris Hellyar/Shutterstock

### EFFECTS OF ACID RAIN



**RESOURCE 15**

**GENERAL REACTION OF AN ACID WITH A METAL HYDROXIDE**

**acid**

**metal hydroxide**

**salt**

**water**