

ELEMENTALS WORD GAME

(Instructions as of August 27, 2020)

Elementals is both a learning aid for chemistry students and a set of word games using a lasercut periodic table of elements.

As a learning aid, students simply place atomic tiles onto their corresponding locations within the periodic table. This helps with visually remembering the elements.

As one of several games, **Elementals** lets students form words using one- and two-letter chemical symbols. For example, "heat" is spelled with two tiles: [He] and [At].

ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE

89 Ac 47 Ag 13 Al 95 Am 18 Ar 33 As 85 At 79 Au 5 B
56 Ba 4 Be 107 Bh 83 Bi 97 Bk 35 Br 6 C 20 Ca 48 Cd
58 Ce 98 Cf 17 Cl 94 Cm 112 Cn 27 Co 24 Cr 55 Cs
29 Cu 105 Db 110 Ds 66 Dy 68 Er 99 Es 63 Eu 9 F 26 Fe
114 Fl 100 Fm 87 Fr 31 Ga 64 Gd 32 Ge 1 H 2 He 72 Hf
80 Hg 67 Ho 108 Hs 53 I 49 In 77 Ir 19 K 36 Kr 57 La 3 Li
103 Lr 71 Lu 116 Lv 115 Mc 101 Md 12 Mg 25 Mn
42 Mo 109 Mt 7 N 11 Na 41 Nb 60 Nd 10 Ne 113 Nh
28 Ni 102 No 93 Np 8 O 118 Og 76 Os 15 P 91 Pa
82 Pb 46 Pd 61 Pm 84 Po 59 Pr 78 Pt 94 Pu 88 Ra 37 Rb
75 Re 104 Rf 111 Rg 45 Rh 86 Rn 44 Ru 16 S 51 Sb
21 Sc 34 Se 106 Sg 14 Si 62 Sm 50 Sn 38 Sr 73 Ta 65 Tb
43 Tc 52 Te 90 Th 22 Ti 81 Tl 69 Tm 117 Ts 92 U 23 V
74 W 54 Xe 39 Y 70 Yb 30 Zn 40 Zr

ATOMIC NUMBER
has your points!

ATOMIC WEIGHT
Not used in the game

CHEMICAL SYMBOL
Use both letters or just the first!

ELEMENT NAME
Learn it just for fun!

ELEMENTAL WORD GAME

1	2	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																108	109	110	111	112	113	114	115	116	117	118
H	He																											
3	4	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																109	110	111	112	113	114	115	116	117	118	119
Li	Be																											
11	12	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																110	111	112	113	114	115	116	117	118	119	120
Na	Mg																											
19	20	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																111	112	113	114	115	116	117	118	119	120	121
K	Ca																											
37	38	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																112	113	114	115	116	117	118	119	120	121	122
Rb	Sr																											
55	56	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																113	114	115	116	117	118	119	120	121	122	123
Cs	Ba																											
87	88	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																114	115	116	117	118	119	120	121	122	123	124
Fr	Ra																											
89	90	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																115	116	117	118	119	120	121	122	123	124	125
Ac	Th																											
89	90	ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE																116	117	118	119	120	121	122	123	124	125	126
Ac	Th																											

COMPONENTS

- Laser-cut wooden tray, ~ 12x18 inches x ¼ inch in size
- 118 laser-cut chemical symbol tiles
- Four tile holders.

PLAY AS A SIMPLE WORD GAME

The periodic table board is not used. Flip all tiles face up. Players take turns finding two tiles that can make 3- or 4-letter words. See Making Words and Scoring below for details.

PLAY AS A MEMORY GAME

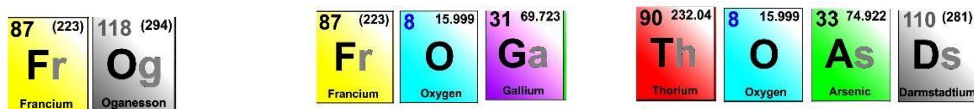
The periodic table board is not used. Flip all tiles face down. Players take turns flipping over four tiles at a time in an attempt to find symbols that will make words. If one or more words are made, simply keep the tiles and score the word(s). Flip back the tiles if a word cannot be made. Use your memory to remember locations of chemical symbols.

PLAY AS A CROSSWORD GAME

This is the most involved way of making words on the board and the focus of the remaining instructions.

MAKING WORDS

To make a word, use the letters on two or more tiles. You can use both letters on any tile as well as just the first bold letter. Using the second (grey) letter is optional. For instance, here are several ways to make FROG and TOADS:



at times ignoring the last, grey letters.

Within the confined space of the periodic table, you can place words three ways:

- Left to right
- Top to bottom
- Diagonally from top left to bottom right

Always declare your word before scoring it.

WORD PLACEMENT ON THE BOARD

Because space on the board is limited, you can add one or more tiles adjacent to other tiles that will not be part of the new word. However, you can use existing tiles as part of the new word. For example, with HAM already placed diagonally, you can make HAUL from the existing H.

PLACING YOUR TILES

If you are not using an existing tile to make a word, one of your tiles must be placed on its matching position within the tray. For instance, when making a word like PLANTS, you could place the “P” on the [P] (phosphorus) or N on Nitrogen, etc.

6 12.011	7 14.007	8 15.999	9 18.998	10 20.180
C Carbon	N Nitrogen	O Oxygen	F Flourine	Ne Neon
14 28.085	15 30.974	57 138.91	7 14.007	117 (294)
Si Silicon	P Phosphorus	La Lanthanum	N Nitrogen	Ts Tennessee
32 72.63	33 74.922	34 78.96	35 79.904	36 83.798

Otherwise, you can make a crossed word by using an existing tile as the first, middle or ending letter(s), for example, NAG is crossed from the N in PLANTS.

7 14.007	8 15.999	9 18.998	10 20.180
N Nitrogen	O Oxygen	F Flourine	Ne Neon
15 30.974	57 138.91	7 14.007	117 (294)
P Phosphorus	La Lanthanum	N Nitrogen	Ts Tennessee
33 74.922	34 78.96	47 107.87	36 83.798
As Arsenic	Se Selenium	Ag Silver	Kr Krypton
51 121.76	52 127.60	53 126.90	54 131.29
Sb Stibium	Te Tellurium	I Iodine	Xe Xenon

Or you could cross PLANTS with [Ru] and [Ne] to make three new words, Rune, Run, Nets:

7 14.007	8 15.999	44 101.07	10 20.180
N Nitrogen	O Oxygen	Ru Ruthenium	Ne Neon
15 30.974	57 138.91	7 14.007	117 (294)
P Phosphorus	La Lanthanum	N Nitrogen	Ts Tennessee

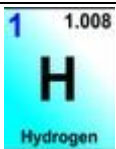
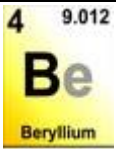
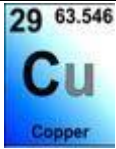
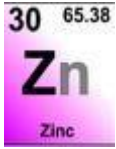


SCORING WORDS


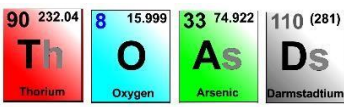
You can score your words in one of two ways: either using entire atomic numbers or their individual digits. If you like to add up big numbers with much higher scores, score using entire atomic numbers.

Otherwise, choose this simpler addition method:

To score using digits, use the individual digit(s) in the atomic number, with a couple of exceptions. When using only the first letter, use the first digit. When using both letters, using

both digits. The exceptions are with atomic numbers 1-9 and 100-118, as well as numbers with zeroes. See the examples below for scoring:

Atomic Number		Score Using only the First Letter	Using Both Letters
1-9		1	N/A
1-9		4	8 (4+4)
11-99		2	11 (2+9)
10,20,30,40,50, 60,70,80,90		3	6 (3+3)
100-109		10	10 (10+0)
110-118		10	11 (10+1)

	Score PLANTS using entire atomic numbers	5+57+7+117	196
	Score PLANTS using digits	1+5+7+7+11+7	38
	Score TOADS using entire atomic numbers	90+8+33+110	124196
	Score PLANTS using digits	9+8+3+11+0	21

When you make two or more new words, add up all the atomic numbers/digits from all associated letters. So when you make RUN, NETS and RUNE above, you would have scored: $44+10+7+117 = 178$ points or $4+4+1+0+7+11+7=34$.

PREPARE TO PLAY

- Remove all tiles and place upside down on the table or in a container
- Give each player seven tiles • Nominate a scorekeeper
- Decide who goes first.

GAME PLAY

On each turn, a player must try to make a word and score its points. Place one or more tiles adjacently. Alternatively, they can swap one of their tiles with one in play as long as the word is kept intact. For example, you could swap [Er] for [Es] in [Fr][Er][N][C][H] (FRENCH).

Always replenish your used tiles such that you always have five tiles until the end of the game. Always declare your word so all players agree.



HAVE FUN WITH WORDS

Use individual tiles to make words periodically. Give your child clues and have them make words like



Visit www.ELEMENTALS.fun and click [GENERATE WORDS] or [VIEW WORDS] for more ideas.

ATOMIC CROSS REFERENCE GUIDE

Use the following cross-reference to find letter fragments to help make a word. Preceding each chemical symbol is its atomic number, which actually is its point value.

ALPHABETIC CHEMICAL SYMBOLS CROSS-REFERENCE

89 **Ac** 47 **Ag** 13 **Al** 95 **Am** 18 **Ar** 33 **As** 85 **At** 79 **Au** 5 **B**
56 **Ba** 4 **Be** 107 **Bh** 83 **Bi** 97 **Bk** 35 **Br** 6 **C** 20 **Ca** 48 **Cd**
58 **Ce** 98 **Cf** 17 **Cl** 96 **Cm** 112 **Cn** 27 **Co** 24 **Cr** 55 **Cs**
29 **Cu** 105 **Db** 110 **Ds** 66 **Dy** 68 **Er** 99 **Es** 63 **Eu** 9 **F** 26 **Fe**
114 **Fl** 100 **Fm** 87 **Fr** 31 **Ga** 64 **Gd** 32 **Ge** 1 **H** 2 **He** 72 **Hf**
80 **Hg** 67 **Ho** 108 **Hs** 53 **I** 49 **In** 77 **Ir** 19 **K** 36 **Kr** 57 **La** 3 **Li**
103 **Lr** 71 **Lu** 116 **Lv** 115 **Mc** 101 **Md** 12 **Mg** 25 **Mn**
42 **Mo** 109 **Mt** 7 **N** 11 **Na** 41 **Nb** 60 **Nd** 10 **Ne** 113 **Nh**
28 **Ni** 102 **No** 93 **Np** 8 **O** 118 **Og** 76 **Os** 15 **P** 91 **Pa**
82 **Pb** 46 **Pd** 61 **Pm** 84 **Po** 59 **Pr** 78 **Pt** 94 **Pu** 88 **Ra** 37 **Rb**
75 **Re** 104 **Rf** 111 **Rg** 45 **Rh** 86 **Rn** 44 **Ru** 16 **S** 51 **Sb**
21 **Sc** 34 **Se** 106 **Sg** 14 **Si** 62 **Sm** 50 **Sn** 38 **Sr** 73 **Ta** 65 **Tb**
43 **Tc** 52 **Te** 90 **Th** 22 **Ti** 81 **Tl** 69 **Tm** 117 **Ts** 92 **U** 23 **V** 74
W 54 **Xe** 39 **Y** 70 **Yb** 30 **Zn** 40 **Zr**

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