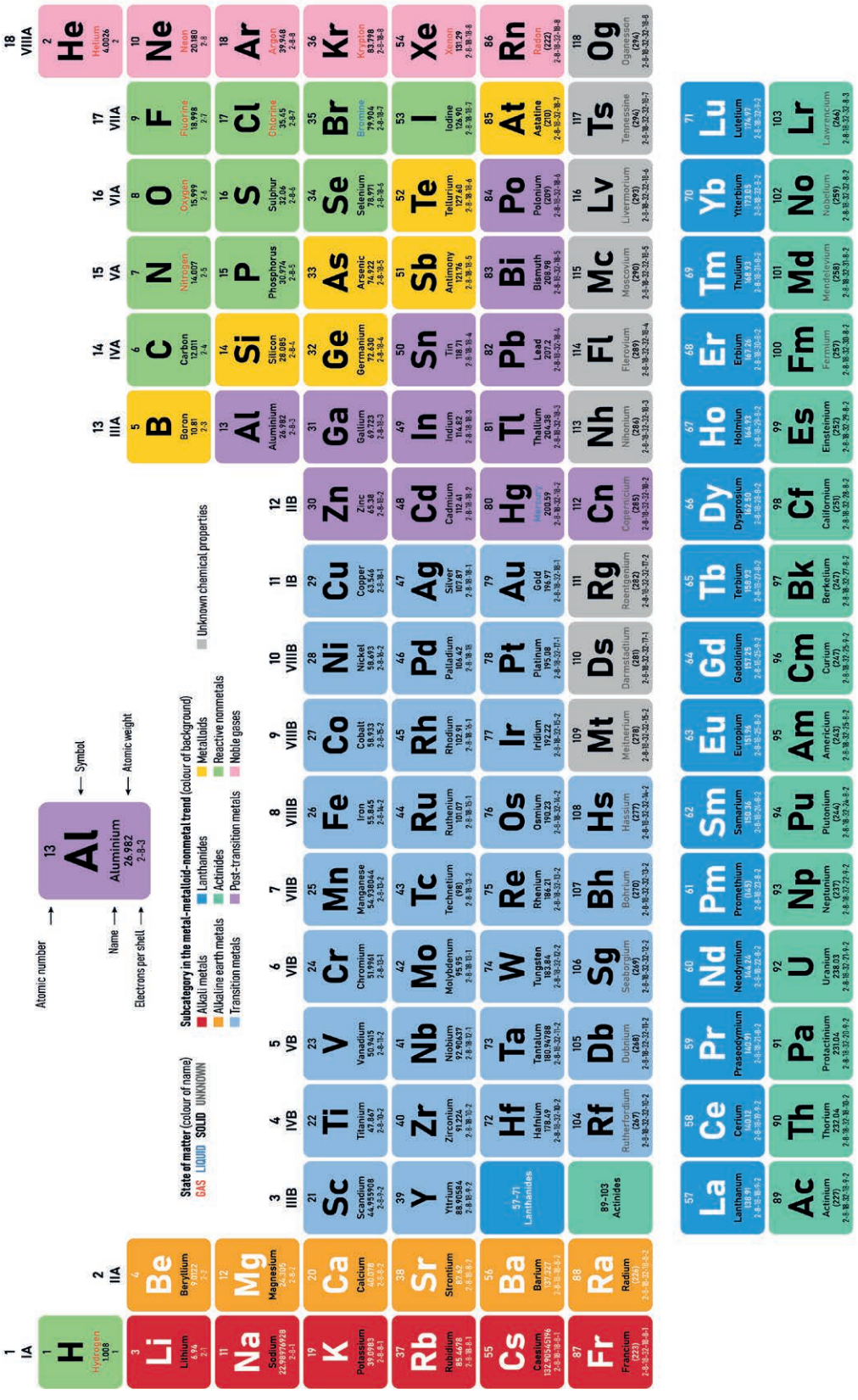
modern English teacher

Periodic table of the elements



modern English teacher

Periodic table game cards

There are three games which can be played with the cards:

1. **Top Trumps:**
   - I. The aim of the game is for the winner to collect all the cards (the 'exothermic reactions' and 'endothermic reactions' cards are not used).
   - II. Deal all the cards, face down, to each of the players (there is no limit on the number of players).
   - III. Each looks at their top card only.
   - IV. The player to the left of the dealer starts looking at the statistics for each element and calls out their best and its value (e.g. 'melting point 180.5°C).
   - V. They place their cards face up in the centre: the player with the highest value picks up all the cards and places them face down under their own cards.
   - VI. A variation of this is to designate either the highest or lowest value by adding the word 'HIGH' or 'LOW' after reading out the statistic (e.g. 'melting point 180.5°C LOW').
   - VII. The winner of the round chooses the next statistic.
   - VIII. The winner is the first player to get all the cards.

2. **Pit:**
   - I. In this trading game, the aim is to collect all six cards in a particular group (e.g. all the alkali metals or all the halogens).
   - II. All the cards are dealt face down to the players in turn (to a maximum of eight players, though a maximum of six and a minimum of four is more realistic).
   - III. The players look at the cards and decide which group they wish to collect.
   - IV. The dealer opens the 'trading floor' by declaring 'trading open'.
   - V. Players then offer the number of cards of the same type face down they want to trade, with a minimum of two cards.
   - VI. Any player can exchange the same number of cards, as long as they are all the same type.
   - VII. The winner is the first to collect all six cards in the same group by shouting 'corner' (they have cornered the market in that commodity) and putting their cards face up on the table.
   - VIII. The winner is awarded the number of points indicated for each group (e.g.: the alkali metals have a score of 20 points).
   - IX. Set a target to be reached, such as 200, 250 or 300 points, to win the game.
   - X. However, there are two 'wild cards' – 'exothermic reactions' and 'endothermic reactions' cards. These can be mixed with other cards without declaring them. The exothermic reactions card can be included in the final total (so, five set cards plus the exothermic card) but if the player has all six cards plus the exothermic card, they gain an additional forty points. If a player has the card when another player wins, they lose forty points. The endothermic reaction card is always bad. It cannot be added to a winning set and the player with the card loses forty points at the end of each round.

3. **Happy Families (or Quartet):**
   - I. In this matching game, the aim is to collect as many sets as possible.
   - II. First, separate the first four cards in each set, which are used, and put the remaining two cards to one side (the 'exothermic reactions' and 'endothermic reactions' cards are not used).
   - III. The dealer shuffles and deals all the cards to each player in turn (from three to six players).
   - IV. The player to the left of the dealer starts by asking any of the other players if they have a card in a set that the asker wants to collect (but must have at least one card in that set).
   - V. If the player has it, they must give it, and the asker may request another card from the same player. If the player does not have a card from that set, they say 'not available' and they become the asker.
   - VI. Decide at the start if the asker can simply request a card from a set (e.g. 'Do you have an alkali metal?') or specifically name the element from the set (e.g. 'Do you have lithium?')
   - VII. The winner is the player who collects most sets.

Periodic table game cards (1 of 12)

Group 1 – The alkali metals (*20 points*)	
^{3}**Li**	
Lithium	
Atomic weight (average)	6.94
First isolated	1821
Melting point (°C)	180.50
Density (g/cm^3)	0.53
Electronegativity (Pauling scale)	0.98
Abundance (mg/L)	20

Group 1 – The alkali metals (*20 points*)	
^{11}**Na**	
Sodium	
Atomic weight (average)	22.99
First isolated	1807
Melting point (°C)	97.79
Density (g/cm^3)	0.96
Electronegativity (Pauling scale)	0.93
Abundance (mg/L)	2.36x10^4

Group 2 – The alkali metals (*20 points*)	
^{19}**K**	
Potassium	
Atomic weight (average)	39.09
First isolated	1807
Melting point (°C)	63.50
Density (g/cm^3)	0.86
Electronegativity (Pauling scale)	0.82
Abundance (mg/L)	2.09x10^4

Group 1 – The alkali metals (*20 points*)	
^{37}**Rb**	
Rubidium	
Atomic weight (average)	85.46
First discovered	1861
Melting point (°C)	39.30
Density (g/cm^3)	1.53
Electronegativity (Pauling scale)	0.82
Abundance (mg/L)	90

Periodic table game cards (2 of 12)

Group 1 – The alkali metals (*20 points*)	Group 1 – The alkali metals (*20 points*)
^{55}**Cs** **Caesium**	^{87}**Fr** **Francium**
Atomic weight (average) 132.91	Atomic weight (average) (223)
First isolated 1882	First isolated 1939
Melting point (°C) 28.50	Melting point (°C) 30.00
Density (g/cm^3) 1.93	Density (g/cm^3) 2.80-3.00
Electronegativity (Pauling scale) 0.79	Electronegativity (Pauling scale) >0.79
Abundance (mg/L) 3	Abundance (mg/L) less than 4x10^{-11}

Group 2 – The alkali earth metals (*40 points*)	Group 2 – The alkali earth metals (*40 points*)
^{4}**Be** **Beryllium**	^{12}**Mg** **Magnesium**
Atomic weight (average) 9.01	Atomic weight (average) 24.30
First isolated 1828	First isolated 1808
Melting point (°C) 1287	Melting point (°C) 650
Density (g/cm^3) 1.85	Density (g/cm^3) 1.73
Electronegativity (Pauling scale) 1.57	Electronegativity (Pauling scale) 1.31
Abundance (mg/L) 2.8	Abundance (mg/L) 2.33x10^4

Periodic table game cards (3 of 12)

Group 2 – The alkali earth metals (*40 points*)	Group 2 – The alkali earth metals (*40 points*)
^{20}**Ca** **Calcium**	^{38}**Sr** **Strontium**
Atomic weight (average) 40.07	Atomic weight (average) 87.62
First isolated 1808	First isolated 1808
Melting point (°C) 842	Melting point (°C) 777
Density (g/cm^3) 1.55	Density (g/cm^3) 2.64
Electronegativity (Pauling scale) 1.00	Electronegativity (Pauling scale) 0.95
Abundance (mg/L) 4.15x10^4	Abundance (mg/L) 370

Group 2 – The alkali earth metals (*40 points*)	Group 2 – The alkali earth metals (*40 points*)
^{56}**Ba** **Barium**	^{88}**Ra** **Radium**
Atomic weight (average) 137.33	Atomic weight (average) (226)
First isolated 1808	First isolated 1910
Melting point (°C) 727	Melting point (°C) 700
Density (g/cm^3) 3.51	Density (g/cm^3) 5.50
Electronegativity (Pauling scale) 0.89	Electronegativity (Pauling scale) 0.90
Abundance (mg/L) 425	Abundance (mg/L) 9x10^{-7}

Periodic table game cards (4 of 12)

Group 3 – The (lighter) transition metals (*60 points*)	Group 3 – The (lighter) transition metals (*60 points*)
^{25}**Mn** **Manganese**	^{26}**Fe** **Iron**
Atomic weight (average) 54.93	Atomic weight (average) 55.84
First isolated 1774	First discovered before 5000 BC
Melting point (°C) 1246	Melting point (°C) 1538
Density (g/cm^3) 7.21	Density (g/cm^3) 7.87
Electronegativity (Pauling scale) 1.55	Electronegativity (Pauling scale) 1.83
Abundance (mg/L) 950	Abundance (mg/L) 5.63x10^4

Group 3 – The (lighter) transition metals (*60 points*)	Group 3 – The (lighter) transition metals (*60 points*)
^{27}**Co** **Cobalt**	^{28}**Ni** **Nickel**
Atomic weight (average) 58.93	Atomic weight (average) 58.69
First isolated 1735	First isolated 1751
Melting point (°C) 1495	Melting point (°C) 1455
Density (g/cm^3) 8.90	Density (g/cm^3) 8.90
Electronegativity (Pauling scale) 1.88	Electronegativity (Pauling scale) 1.91
Abundance (mg/L) 25	Abundance (mg/L) 84

Periodic table game cards (5 of 12)

Group 3 – The (lighter) transition metals (*60 points*)	Group 3 – The (lighter) transition metals (*60 points*)
^{29}**Cu** **Copper**	^{30}**Zn** **Zinc**
Atomic weight (average) 63.54	Atomic weight (average) 65.38
First discovered 9000 BC	First isolated 1746
Melting point (°C) 1084	Melting point (°C) 419.53
Density (g/cm^3) 8.96	Density (g/cm^3) 7.14
Electronegativity (Pauling scale) 1.90	Electronegativity (Pauling scale) 1.65
Abundance (mg/L) 60	Abundance (mg/L) 70

Group 4 – The (heavier) transition metals (*100 points*)	Group 4 – The (heavier) transition metals (*100 points*)
^{46}**Pd** **Palladium**	^{47}**Ag** **Silver**
Atomic weight (average) 106.42	Atomic weight (average) 107.87
First isolated 1802	First isolated before 5000 BC
Melting point (°C) 1554.9	Melting point (°C) 961.78
Density (g/cm^3) 12.023	Density (g/cm^3) 10.49
Electronegativity (Pauling scale) 2.20	Electronegativity (Pauling scale) 1.93
Abundance (mg/L) 1.5×10^{-2}	Abundance (mg/L) 7.5×10^{-2}

Periodic table game cards (6 of 12)

Group 4 – The (heavier) transition metals (*100 points*)	Group 4 – The (heavier) transition metals (*100 points*)
^{48}**Cd** **Cadmium**	^{78}**Pt** **Platinum**
Atomic weight (average) 112.41	Atomic weight (average) 195.08
First isolated 1817	First discovered 1735
Melting point (°C) 321.07	Melting point (°C) 1768.3
Density (g/cm^3) 8.65	Density (g/cm^3) 21.45
Electronegativity (Pauling scale) 1.65	Electronegativity (Pauling scale) 2.28
Abundance (mg/L) 0.15	Abundance (mg/L) 5x10^{-3}

Group 4 – The (heavier) transition metals (*100 points*)	Group 4 – The (heavier) transition metals (*100 points*)
^{79}**Au** **Gold**	^{80}**Hg** **Mercury**
Atomic weight (average) 196.97	Atomic weight (average) 200.59
First discovered before 6000 BC	First discovered before 2000 BC
Melting point (°C) 1064.18	Melting point (°C) -38.29
Density (g/cm^3) 19.30	Density (g/cm^3) 13.53
Electronegativity (Pauling scale) 2.54	Electronegativity (Pauling scale) 2.00
Abundance (mg/L) 4x10^{-3}	Abundance (mg/L) 8.5x10^{-2}

Periodic table game cards (7 of 12)

Group 5 – The post-transition metals (*80 points*)	
^{15}Al Aluminium	
Atomic weight (average)	26.98
First isolated	1824
Melting point (°C)	600.32
Density (g/cm^3)	2.70
Electronegativity (Pauling scale)	1.61
Abundance (mg/L)	8.23x10^4

Group 5 – The post-transition metals (*80 points*)	
^{31}Ga Gallium	
Atomic weight (average)	69.72
First isolated	1875
Melting point (°C)	29.76
Density (g/cm^3)	5.91
Electronegativity (Pauling scale)	1.81
Abundance (mg/L)	19

Group 5 – The post-transition metals (*80 points*)	
^{49}In Indium	
Atomic weight (average)	114.82
First isolated	1864
Melting point (°C)	156.59
Density (g/cm^3)	7.31
Electronegativity (Pauling scale)	1.78
Abundance (mg/L)	0.25

Group 5 – The post-transition metals (*80 points*)	
^{50}Sn Tin	
Atomic weight (average)	118.71
First discovered	around 3500 BC
Melting point (°C)	231.93
Density (g/cm^3)	7.26 / 5.76
Electronegativity (Pauling scale)	1.96
Abundance (mg/L)	2.3

Periodic table game cards (8 of 12)

Group 5 – The post-transition metals (*80 points*)	
^{81}Tl Thallium	
Atomic weight (average)	204.38
First isolated	1862
Melting point (°C)	304
Density (g/cm^3)	11.85
Electronegativity (Pauling scale)	1.62
Abundance (mg/L)	0.85

Group 5 – The post-transition metals (*80 points*)	
^{82}Pb Lead	
Atomic weight (average)	207.2
First discovered	around 7000 BC
Melting point (°C)	327.46
Density (g/cm^3)	11.34
Electronegativity (Pauling scale)	1.87
Abundance (mg/L)	14

Group 6 – The metaloids (*60 points*)	
^{5}B Boron	
Atomic weight (average)	10.81
First isolated	1808
Melting point (°C)	2076
Density (g/cm^3)	2.08
Electronegativity (Pauling scale)	2.04
Abundance (mg/L)	10

Group 6 – The metaloids (*60 points*)	
^{14}Si Silicon	
Atomic weight (average)	20.08
First isolated	1823
Melting point (°C)	1414
Density (g/cm^3)	2.32
Electronegativity (Pauling scale)	1.90
Abundance (mg/L)	2.82x10^5

Periodic table game cards (9 of 12)

Group 6 – The metaloids (*60 points*)		Group 6 – The metaloids (*60 points*)	
^{32}Ge Germanium		^{33}As Arsenic	
Atomic weight (average)	72.63	Atomic weight (average)	74.92
First discovered	1886	First isolated	before 300 CE
Melting point (°C)	938.25	Sublimation point (°C)	615
Density (g/cm^3)	5.32	Density (g/cm^3)	5.72
Electronegativity (Pauling scale)	2.01	Electronegativity (Pauling scale)	2.18
Abundance (mg/L)	1.5	Abundance (mg/L)	1.8

Group 6 – The metaloids (*60 points*)		Group 6 – The metaloids (*60 points*)	
^{51}Sb Antimony		^{52}Te Tellurium	
Atomic weight (average)	121.76	Atomic weight (average)	127.60
First isolated	before 800 CE	First discovered	1782
Melting point (°C)	630.63	Melting point (°C)	449.51
Density (g/cm^3)	6.69	Density (g/cm^3)	6.24
Electronegativity (Pauling scale)	2.05	Electronegativity (Pauling scale)	2.10
Abundance (mg/L)	0.2	Abundance (mg/L)	1x10^{-3}

Periodic table game cards (10 of 12)

Group 7 – Other non-metals (*40 points*)	Group 7 – Other non-metals (*40 points*)
^{6}C **Carbon**	^{7}N **Nitrogen**
Atomic weight (average) 12.01	Atomic weight (average) 14.00
First recognised as an element 1789	First isolated 520.2
Sublimation point (°C) 3642	Melting point (°C) -210
Density (g/cm^3) 1.8-2.1/2.26/3.51	Density (g/L) 1.25
Electronegativity (Pauling scale) 2.55	Electronegativity (Pauling scale) 3.04
Abundance (mg/L) 200	Abundance (mg/L) 19

Group 7 – Other non-metals (*40 points*)	Group 7 – Other non-metals (*40 points*)
^{8}O **Oxygen**	^{9}F **Fluorine**
Atomic weight (average) 15.99	Atomic weight (average) 18.99
First discovered 1771	First isolated 1886
Melting point (C) -218.79	Melting point (°C) -219.67
Density (g/L) 1.429	Density (g/L) 1.696
Electronegativity (Pauling scale) 3.44	Electronegativity (Pauling scale) 3.98
Abundance (mg/L) 4.61x10^5	Abundance (mg/L) 585

Periodic table game cards (11 of 12)

Group 7 – Other non-metals (*40 points*)	Group 7 – Other non-metals (*40 points*)
^{15}**P** **Phosphorous**	^{16}**S** **Sulphur**
Atomic weight (average) 30.97	Atomic weight (average) 32.06
First discovered 1669	First recognised as an element 1777
Melting point (°C) 44.15	Melting point (°C) 115.21
Density (g/cm^3) 1.82 – 2.69	Density (g/cm^3) 1.92 – 2.07
Electronegativity (Pauling scale) 2.19	Electronegativity (Pauling scale) 2.58
Abundance (mg/L) 1.05x10^3	Abundance (mg/L) 350

Group 8 – The noble gases (*20 points*)	Group 8 – The noble gases (*20 points*)
^{2}**He** **Helium**	^{10}**Ne** **Neon**
Atomic weight (average) 4.00	Atomic weight (average) 20.18
First isolated 1895	First isolated 1898
Melting point (°C) -272.2	Melting point (°C) -453.65
Density (g/L) 0.178	Density (g/L) 0.900
Electronegativity (Pauling scale) no data	Electronegativity (Pauling scale) no data
Abundance (mg/L) 8x10^{-3}	Abundance (mg/L) 5x10^{-3}

Periodic table game cards (12 of 12)

Group 8 – The noble gases (*20 points*)	Group 8 – The noble gases (*20 points*)
^{18}**Ar** **Argon**	^{36}**Kr** **Krypton**
Atomic weight (average) 39.94	Atomic weight (average) 83.79
First isolated 1894	First isolated 1898
Melting point (°C) -185.848	Melting point (°C) -153.415
Density (g/L) 1.784	Density (g/L) 3.749
Electronegativity (Pauling scale) no data	Electronegativity (Pauling scale) 3.00
Abundance (mg/L) 3.5	Abundance (mg/L) $1x10^{-4}$

Group 8 – The noble gases (*20 points*)	Group 8 – The noble gases (*20 points*)
^{54}**Xe** **Xenon**	^{86}**Rd** **Radon**
Atomic weight (average) 131.29	Atomic weight (average) (222)
First isolated 1898	First isolated 1910
Melting point (°C) -111.75	Melting point (°C) -71
Density (g/L) 5.894	Density (g/L) 9.73
Electronegativity (Pauling scale) 2.6	Electronegativity (Pauling scale) 2.2
Abundance (mg/L) $3x10^{-5}$	Abundance (mg/L) $4x10^{-11}$

Periodic table game cards (*'wild cards' when playing the 'PIT' version*)

Wild Card – Endothermic reactions (*-40 points*)	Wild Card – Exothermic reactions (*+/-40 points*)
Endothermic reactions This is a **BAD** card to have: you cannot make a set (and so, win) if you have it. Plus, if you have it at the end of the game you lose 40 points. You can't give it to another player on its own but **ALWAYS** with at least one other card (but, of course, don't tell anybody you've got it 😉)	**Exothermic reactions** This can be a **GOOD** card to have: you can use it as a 'wild card', so can make a set with 5 cards plus this. If you make a set of 6 plus this card you get an extra 40 points in addition to the set score. But if you have it when someone else gets a set of 6, you lose 40 points.