

Elemental Su Doku

Student worksheet

Chemistry for the gifted and talented

Elemental Su Doku

Puzzle 1

Use the clues to place the elements in the grid. The clues are given in the form of numbers. The clues are given in the form of numbers. The clues are given in the form of numbers.

Clues:

Across: 1. A diatomic gas that is essential for life. 2. A metal that is used in alloys. 3. A non-metal that is a gas at room temperature. 4. A metal that is used in alloys. 5. A non-metal that is a gas at room temperature. 6. A metal that is used in alloys. 7. A non-metal that is a gas at room temperature. 8. A metal that is used in alloys. 9. A non-metal that is a gas at room temperature. 10. A metal that is used in alloys.

Down:

1. A diatomic gas that is essential for life. 2. A metal that is used in alloys. 3. A non-metal that is a gas at room temperature. 4. A metal that is used in alloys. 5. A non-metal that is a gas at room temperature. 6. A metal that is used in alloys. 7. A non-metal that is a gas at room temperature. 8. A metal that is used in alloys. 9. A non-metal that is a gas at room temperature. 10. A metal that is used in alloys.

Grid:

Elements:

Li, C, N, O, F, Ne, Na, Mg, Al, Si, P, S, Cl, Ar, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr, Rb, Sr, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Xe, Ba, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg, Tl, Pb, Bi, Po, At, Rn, Fr, Ra, Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr.

Student worksheet: CDROM index 14SW

Discussion of answers

Chemistry for the gifted and talented

Elemental Su Doku

Puzzle 1

Grid:

Li	C	N	O	F	Ne	Na	Mg	Al	Si
Ar	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co
Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	Rb
Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag
Cd	In	Sn	Sb	Te	I	Xe	Ba	La	Ce
Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er
Tm	Yb	Lu	Hf	Ta	W	Re	Os	Ir	Pt
Au	Hg	Tl	Pb	Bi	Po	At	Rn	Fr	Ra
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf
Es	Fm	Md	No	Lr					

Discussion of answers: CDROM index 14DA

Topics

Groups and periods in the Periodic Table.

Level

Middle to high ability students in the 11–16 age range.

Prior knowledge

The numbering of groups and periods in the Periodic Table.

Rationale

This activity helps students gain a familiarity with the Periodic Table by getting them to continually refer to it in a problem solving activity. Students should more easily recall the elements in the same group after doing some of these problems. The logical skills developed in solving the puzzle are useful.

Use

This activity could be used at any time but is best used in conjunction with work on the Periodic Table. Three elemental Su Doku puzzles are given with answers. Students should start with puzzle 1 as this contains the most detailed explanation of how to solve it.

Further puzzles can be readily generated using the Excel® templates in the post-16 sections *DIY Su Doku* CDROM index 35EX and *DIY ionic Su Doku* CDROM index 36EX. Instructions for doing this can be found on pages 71–74.



Chemistry for the gifted and talented

Elemental Su Doku

Puzzle 1

In *Elemental Su Doku* you need to use logic to work out the elements in the blank squares. You will need to be able to see a Periodic Table.

Every row, column and 3x3 box contains an element from groups 1, 2, 3, 4, 5, 6, 7, 0 and a transition metal.

Each **3x3 box** is based on a **period**, so the elements in Groups 1, 2, 3, 4, 5, 6, 7 and 0 in a 3x3 box come from the same period apart from the transition metal. The transition metal in the box could be any transition metal, but Fe is used in the answer grid so you may find it easier to check your answers if you use Fe as well.

For example, in the top right 3x3 box the Group 1 element must be in the bottom row, because there is already a Group 1 element (Li & Na) in the top two rows of 9. The Group 1 metal clearly must go into the only space available in the bottom row of that 3x3 box. The other elements in that 3x3 box are from period 2 so the Group 1 metal must be Li (not Na or K). Good luck!

Rating: Easy

Li			Ar	Al				Be
N	F				Na			
			P		Cu		O	C
Cl		Si			Ne	P	Mn	
		Al		Li		Si		
	P	Na	C			Al		S
B	O		Cl		Si			
			S				F	Ni
Ne		F		P	Mg			B

continued on page 2



Chemistry for the gifted and talented

Puzzle 2

In *Elemental Su Doku* you need to use logic to work out the elements in the blank squares. You will need to be able to see a Periodic Table.

Every row, column and 3x3 box contains an element from Groups 1, 2, 3, 4, 5, 6, 7, 0 and a transition metal.

Each **3x3 box** is based on a **period**, so the elements in Groups 1, 2, 3, 4, 5, 6, 7 and 0 in a 3x3 box come from the same period apart from the transition metal. The transition metal in the box could be any transition metal, but Fe is used in the answer grid so you may find it easier to check your answers if you use Fe as well. Good luck!

Rating: Moderate

	O	Li		B			Be	
	N				Ne	Li		F
Fe					F		B	C
		Ni			S		Cl	Ar
		Al	Mg		Ag	P		
P	Cl		Al			Co		
K	Zn		Br				Kr	
Kr		Ca	Ge				Se	
	Ge			K		Ca	As	

continued on page 3



Chemistry for the gifted and talented

Puzzle 3

In *Elemental Su Doku* you need to use logic to work out the elements in the blank squares. You will need to be able to see a Periodic Table.

Every row, column and 3x3 box contains an element from Groups 1, 2, 3, 4, 5, 6, 7, 0 and a transition metal.

Each **3x3 box** is based on a **period**, so the elements in Groups 1, 2, 3, 4, 5, 6, 7 and 0 in a 3x3 box come from the same period apart from the transition metal. The transition metal in the box could be any transition metal, but Fe is used in the answer grid so you may find it easier to check your answers if you use Fe as well. Good luck!

Rating: Moderate

Be			Cl				As	
			Na	Si				Se
F					Mg	Ga		Fe
Cu			Po			Sr	Sn	
	I			Ba			Xe	
	Sr		Rn		Cs			In
Ne		C	Cr					
O			Si	Ar				
	Zn				Al			Kr



Elemental Su Doku

Puzzle 1

Rating: Easy

Li	C	Fe	Ar	Al	S	F	N	Be
N	F	O	Mg	Si	Na	Fe	B	Ne
Be	B	Ne	P	Cl	Cu	Li	O	C
Cl	Mg	Si	B	O	Ne	P	Mn	Na
S	Ar	Al	Fe	Li	N	Si	Mg	Cl
Fe	P	Na	C	Be	F	Al	Ar	S
B	O	Be	Cl	Fe	Si	Ne	Li	N
C	Li	N	S	Ar	Al	Be	F	Ni
Ne	Fe	F	Na	P	Mg	O	C	B

continued on page 2



Chemistry for the gifted and talented

Puzzle 2

Rating: Moderate

F	O	Li	Fe	B	C	Ne	Be	N
B	N	C	O	Be	Ne	Li	Fe	F
Fe	Be	Ne	Li	N	F	O	B	C
Mg	Na	Ni	P	Si	S	Al	Cl	Ar
Si	Ar	Al	Mg	Cl	Ag	P	Na	S
P	Cl	S	Al	Ar	Na	Co	Si	Mg
K	Zn	As	Br	Se	Ca	Ge	Kr	Ga
Kr	Ga	Ca	Ge	Fe	As	Br	Se	K
Se	Ge	Br	Kr	K	Ga	Ca	As	Fe

continued on page 3



Chemistry for the gifted and talented

Puzzle 3

Rating: Moderate

Be	O	Li	Cl	Al	Fe	Kr	As	Ge
B	N	Fe	Na	Si	Ar	Br	Ca	Se
F	C	Ne	P	S	Mg	Ga	K	Fe
Cu	Xe	In	Po	Bi	At	Sr	Sn	Rb
Rb	I	Te	Tl	Ba	Pb	Fe	Xe	Sb
Sn	Sr	Sb	Rn	Fe	Cs	Te	I	In
Ne	Li	C	Cr	Cl	S	As	Ga	Ca
O	B	Be	Si	Ar	P	K	Fe	Br
N	Zn	F	Mg	Na	Al	Ge	Se	Kr