

## Chemistry for Nursing Readiness Test (self assessment)

This test covers some of the chemistry that will be covered in the early stages of your pre-registration nursing degree. It is useful to have some degree of prior familiarity with the material. Have a first quick look through the test. If you are unable to answer any of the questions, it is recommended that you attend the course - Success in Chemistry for Nurses being offered in February. If possible, work through the test answering all the questions. When you have completed the test, check your answers and assess your own knowledge and understanding. If you were easily able to work all questions, made only minor errors, or would be comfortable with reviewing the material yourself, then you do not need to attend the course. If however you had considerable difficulty with the test, it would be recommended that you too take advantage of the course in February, prior to the start of semester. Places in the course are limited, so please do not apply for the course if your background knowledge and understanding of chemistry is adequate.

A periodic table and details of some anions and cations are provided below for your reference.

### PERIODIC CHART OF THE ELEMENTS

1 <b>H</b> 1.008																	2 <b>He</b> 4.003
3 <b>Li</b> 6.941	4 <b>Be</b> 9.012											5 <b>B</b> 10.81	6 <b>C</b> 12.01	7 <b>N</b> 14.01	8 <b>O</b> 16.00	9 <b>F</b> 19.00	10 <b>Ne</b> 20.18
11 <b>Na</b> 22.99	12 <b>Mg</b> 24.31	3B 3	4B 4	5B 5	6B 6	7B 7	← 8B 8 9 10	→ 1B 11	2B 12	13 <b>Al</b> 26.98	14 <b>Si</b> 28.09	15 <b>P</b> 30.97	16 <b>S</b> 32.07	17 <b>Cl</b> 35.45	18 <b>Ar</b> 39.95		
19 <b>K</b> 39.10	20 <b>Ca</b> 40.08	21 <b>Sc</b> 44.96	22 <b>Ti</b> 47.88	23 <b>V</b> 50.94	24 <b>Cr</b> 52.00	25 <b>Mn</b> 54.94	26 <b>Fe</b> 55.85	27 <b>Co</b> 58.93	28 <b>Ni</b> 58.69	29 <b>Cu</b> 63.55	30 <b>Zn</b> 65.39	31 <b>Ga</b> 69.72	32 <b>Ge</b> 72.61	33 <b>As</b> 74.92	34 <b>Se</b> 78.96	35 <b>Br</b> 79.90	36 <b>Kr</b> 83.80
37 <b>Rb</b> 85.47	38 <b>Sr</b> 87.62	39 <b>Y</b> 88.91	40 <b>Zr</b> 91.22	41 <b>Nb</b> 92.91	42 <b>Mo</b> 95.94	43 <b>Tc</b> (98)	44 <b>Ru</b> 101.1	45 <b>Rh</b> 102.9	46 <b>Pd</b> 106.4	47 <b>Ag</b> 107.9	48 <b>Cd</b> 112.4	49 <b>In</b> 114.8	50 <b>Sn</b> 118.7	51 <b>Sb</b> 121.8	52 <b>Te</b> 127.6	53 <b>I</b> 126.9	54 <b>Xe</b> 131.3
55 <b>Cs</b> 132.9	56 <b>Ba</b> 137.3	*La 138.9	72 <b>Hf</b> 178.5	73 <b>Ta</b> 180.9	74 <b>W</b> 183.9	75 <b>Re</b> 186.2	76 <b>Os</b> 190.2	77 <b>Ir</b> 192.2	78 <b>Pt</b> 195.1	79 <b>Au</b> 197.0	80 <b>Hg</b> 200.6	81 <b>Tl</b> 204.4	82 <b>Pb</b> 207.2	83 <b>Bi</b> 209.0	84 <b>Po</b> (209)	85 <b>At</b> (210)	86 <b>Rn</b> (222)
87 <b>Fr</b> (223)	88 <b>Ra</b> 226.0	†Ac 227.0	104 <b>Rf</b> (261)	105 <b>Ha</b> (262)	106 <b>ϕ</b> (263)	107 <b>Ns</b> (262)	108 <b>Hs</b> (265)	109 <b>Mt</b> (266)									

* Lanthanide series	58 <b>Ce</b> 140.1	59 <b>Pr</b> 140.9	60 <b>Nd</b> 144.2	61 <b>Pm</b> (145)	62 <b>Sm</b> 150.4	63 <b>Eu</b> 152.0	64 <b>Gd</b> 157.3	65 <b>Tb</b> 158.9	66 <b>Dy</b> 162.5	67 <b>Ho</b> 164.9	68 <b>Er</b> 167.3	69 <b>Tm</b> 168.9	70 <b>Yb</b> 173.0	71 <b>Lu</b> 175.0
† Actinide series	90 <b>Th</b> 232.0	91 <b>Pa</b> 231.0	92 <b>U</b> 238.0	93 <b>Np</b> 237.0	94 <b>Pu</b> (244)	95 <b>Am</b> (243)	96 <b>Cm</b> (247)	97 <b>Bk</b> (247)	98 <b>Cf</b> (251)	99 <b>Es</b> (252)	100 <b>Fm</b> (257)	101 <b>Md</b> (258)	102 <b>No</b> (259)	103 <b>Lr</b> (260)

All atomic weights have been rounded off to four significant figures.

### Cations

Sodium	Na <sup>+</sup>
Calcium	Ca <sup>2+</sup>
Potassium	K <sup>+</sup>
Magnesium	Mg <sup>2+</sup>
Aluminium	Al <sup>3+</sup>

### Anions

Chloride	Cl <sup>-</sup>
Hydroxide	OH <sup>-</sup>
Bicarbonate (hydrogen carbonate)	HCO <sub>3</sub> <sup>-</sup>
Carbonate	CO <sub>3</sub> <sup>2-</sup>
Sulphate	SO <sub>4</sub> <sup>2-</sup>

1. Many of the science texts for nurses refer to elements by symbols. Complete the table below giving either the corresponding name or symbol of the element.

Element name	Element symbol
Oxygen	O
Hydrogen	
Sodium	
Magnesium	
	C
	K
	Ca
	Cl
	Fe

2. A carbon atom has an atomic number of 6, and a mass number of 12. How many protons, electrons and neutrons does this atom have?

Protons,                  electrons and                  neutrons.

3. A oxygen atom has a mass number of 16. How many protons, electrons and neutrons does this atom have?

Protons,                  electrons and                  neutrons.

4. Classify the following elements as either a metal or a non-metal.

<b>Element</b>	<b>Metal/non-metal</b>
Sodium	
Chlorine	
Hydrogen	
Iron	
Potassium	
Calcium	
Nitrogen	

5. Complete the following table to give the electron arrangements for the following elements.

<b>Element</b>	<b>Atomic number</b>	<b>Number of electrons in each shell</b>			
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Hydrogen	1	1			
Carbon	6				
Nitrogen	7				
Oxygen	8				
Sodium	11				
Magnesium	12				
Aluminium	13				
Chlorine	17				
Potassium	19	2	8	8	1
Calcium	20	2	8	8	2

6. From the table in question 5, give the number of valence electrons for the following elements.

<b>Element</b>	<b>Valence electrons</b>
Hydrogen	
Carbon	
Nitrogen	
Oxygen	
Sodium	
Magnesium	
Aluminium	
Chlorine	
Potassium	
Calcium	

7. Complete the following table to give either the name or the formula for the following ionic compounds.

Name	Formula
Sodium chloride	NaCl
Magnesium chloride	
Sodium hydroxide	
Calcium bicarbonate	
Aluminium hydroxide	
	NaHCO <sub>3</sub>
	CaSO <sub>4</sub>

8. Complete the following table to give either the name or the formula for the following covalent compounds.

Name	Formula
Carbon dioxide	
Water	
Oxygen	
Chlorine	
	H <sub>2</sub>
	CCl <sub>4</sub>
	N <sub>2</sub>

9. What is the molecular or formula mass of
- Hydrogen (H<sub>2</sub>)
  - Hydrochloric acid (HCl)
10. What is the molar mass (the mass of one mole of the substance) of
- Sodium hydroxide (NaOH)
  - Oxygen (O<sub>2</sub>)
11. Dextrose (glucose) is found as an energy source in IV fluids. If 32 g of dextrose is dissolved and made up to give 800 mL of solution, calculate the percentage concentration (w/v) of the solution.