

Y10 Chemistry Fact Sheet

Bold – Triple Only *Italics – Higher Only*

Atomic Structure	Elements, Compounds and mixtures	<ol style="list-style-type: none"> 1. An element is a substance which contains only one TYPE of atom. 2. A compound is a substance which contains two or more types of atom bonded together. 3. Mixtures contain different elements or compounds that can be separated as they are not chemically bonded together. 4. In chemical reactions the starting materials are called reactants and new products are made. 5. There are 4 state symbols; (s) = solid (l) = liquid (g) = gas (ag) = aqueous (dissolved in solution) 6. You separate an insoluble solid from a solution by filtering it out. The solid can then be washed and dried to remove any impurities. 7. To separate a salt from a solution you evaporate the water to produce crystals of salt. 8. To separate and collect a liquid from a mixture you use distillation. You can use distillation to separate a mixture of liquids.
	Atomic Structure	<ol style="list-style-type: none"> 9. There are 3 subatomic particles; protons, electrons and neutrons. 10. Protons are positive (relative charge is +1) and have a relative mass of 1. 11. Electrons are negative (relative charge is -1) and their relative mass is very small. 12. Neutrons are neutral (relative charge is 0) and have a relative mass of 1. 13. Protons and neutrons are found in the nucleus and electrons orbit the nucleus. 14. Atoms have no overall charge because the number of positive protons is equal to the number of negative electrons. 15. The atomic number is the number of protons 16. The mass number is the number of protons and neutrons in total. 17. Atoms of the same element can have different numbers of neutrons; these atoms are called isotopes. 18. Electrons are arranged in energy levels (shells). The lowest energy level (shell) can hold a maximum of 2 electrons, the second can hold 8 and the third can hold 8. 19. Electrons occupy the lowest available energy level. 20. The electronic structure can be shown as a diagram or as numbers. Eg for sodium that has 11 electrons, the electronic structure is 2,8,1
	Development of model of atom	<ol style="list-style-type: none"> 21. Dalton thought atoms were hard spheres and that elements had only one type of atom. 22. J.J. Thompson discovered the electron (tiny negatively charged particle) and described atoms like 'plum puddings' with negative charges embedded in a cloud of positive charge. 23. Geiger and Marsden's did experiments firing positive alpha particles at gold foil which showed atoms could not be solid. 24. Rutherford proposed that the positive charge of an atom is in a small centre which he called the nucleus and electrons orbit this nucleus. (This is the nuclear model) 25. In 1914 Niels Bohr suggested electrons orbit at set distances in energy levels (or shells). 26. In 1932 James Chadwick discovered the neutron which has no charge and has the same mass as a proton

Y10 Chemistry Fact Sheet

Bold – Triple Only *Italics – Higher Only*

The Periodic Table	Development of periodic table	<p>27. Before the discovery of protons, electrons and neutrons, scientists ordered the elements by their atomic weight.</p> <p>28. Mendeleev placed elements in more appropriate places, grouping elements with similar properties so patterns could be seen. This meant he sometimes left gaps or changed the order of atomic weight.</p> <p>29. Elements with properties Mendeleev predicted were discovered and filled the gaps.</p> <p>30. The elements on the modern periodic table are arranged in order of increasing atomic number.</p> <p>31. Elements are arranged in columns called groups (going down) on the periodic table.</p> <p>32. The number of electrons in the outermost shell of an atom is the same as its group on the periodic table.</p>
	Group 0	<p>33. Elements in the same group have similar properties.</p> <p>34. Group 0 are called the noble gases. They are unreactive because of their very stable electron arrangement (full out shell)</p> <p>35. The boiling point of the noble gases increases with increasing relative atomic mass (as you go down the group).</p> <p>36. Boiling point and condensing point are the same temperature.</p>
	Group 1	<p>37. Group 1 are the alkali metals.</p> <p>38. All group 1 atoms have 1 electron in their outer energy level.</p> <p>39. Group 1 metals are very reactive.</p> <p>40. When they react they lose their outer electron to form a full outer energy level and become stable.</p> <p>41. Group 1 metals are stored in oil to stop the oxidising.</p> <p>42. They have low densities and float in water.</p> <p>43. Group 1 metals react vigorously with water producing an alkaline solution of the metal hydroxide plus hydrogen gas.</p> <p>44. Group 1 metals react with halogen to produce metal halides which are white soluble solids.</p> <p>45. The reactivity of group 1 increases as you go down the group.</p>
	Group 7	<p>46. Group 7 elements are known as the halogens.</p> <p>47. Group 7 elements all react in a similar way as they all have 7 electrons in their outer shell.</p> <p>48. Group 7 elements are non- metals and consist of molecules made of pairs of atoms eg Br₂</p> <p>49. The melting point and boiling point of group 7 increase as you go down the group.</p> <p>50. In group 7 the reactivity decreases as you go down the group.</p> <p>51. The halogens form ions with a charge of 1- by gaining an electron when reacting with metals to form ionic compounds.</p> <p>52. A more reactive halogen will displace a less reactive halogen from a compound.</p> <p>53. The halogens form covalent molecules by sharing electrons with other non- metals.</p>

Y10 Chemistry Fact Sheet

Bold – Triple Only *Italics – Higher Only*

Bonding and Properties of Matter	Metals	<p>54. Metals are found in the centre of the periodic table and to the left and bottom of the periodic table.</p> <p>55. Metals react to form positive ions.</p> <p>56. The atoms in metals are closely packed together in regular layers</p> <p>57. The electrons in the outer shells of metals are delocalised and are free to move throughout the metallic lattice. This creates strong metallic bonding.</p> <p>58. Most metals have high melting and boiling points.</p> <p>59. Metals can be bent and shaped as the layers of atoms can slide over each other.</p> <p>60. Alloys are mixtures of a metal with other elements.</p> <p>61. Alloys are harder than pure metals as the layers are distorted and cannot slide.</p> <p>62. Metals are good conductors of electricity because the delocalised electrons move through the structure.</p> <p>63. Metals are good conductors of heat as the delocalised electrons can transfer the thermal energy.</p> <p>64. Transition metals have higher melting points than group 1 metals and are also stronger, harder and more dense.</p> <p>65. Transition metals are less reactive than group 1 metals.</p> <p>66. Transition metal elements have ions with different charges, form coloured compounds and are useful as catalysts.</p>
	Ionic Bonding	<p>67. Ionic bonding occurs between metals and non- metals.</p> <p>68. Metal atoms lose electrons to form positive ions.</p> <p>69. Non- metal atoms tend to gain electrons to form negative ions.</p> <p>70. Ionic compounds are held together by strong electrostatic forces of attraction between oppositely charged ions.</p> <p>71. Ionic compounds form giant lattices.</p> <p>72. Ionic compounds have high melting and boiling points.</p> <p>73. Ionic compounds do not conduct electricity when solid as the ions are not free to move.</p> <p>74. When melted or dissolved, ionic compounds conduct electricity as the ions are free to move.</p>
	Covalent Bonding	<p>75. Covalent bonds are formed when non-metal atoms share pairs of electrons.</p> <p>76. Covalent bonds are strong.</p> <p>77. Many covalent compounds consist of small, simple molecules e.g., oxygen, chlorine and water.</p> <p>78. They are usually gases or liquids with low melting and boiling points.</p> <p>79. Small covalent molecules have weak intermolecular forces between the molecules.</p> <p>80. When these substances are heated it is the intermolecular forces that break not the covalent bonds.</p> <p>81. Simple covalent molecules do not conduct electricity because the molecules do not have an overall charge.</p> <p>82. Polymers are very large molecules held together by strong covalent bonds.</p> <p>83. Some covalently bonded substances have giant structures eg silicon dioxide , diamond and graphite.</p> <p>84. Giant covalent structures have very high melting and boiling points.</p>