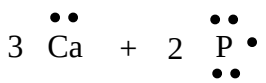
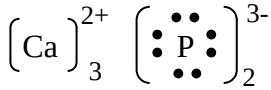
Worksheet 2.1: Solutions

Review of strong bonding

No.	Answer
1	**a** Covalent **b** Ionic **c** Covalent **d** Metallic **e** Covalent **f** Ionic
2	**Sodium** **a** The diagram should show positive sodium ions, Na^+ and a delocalised electron from every positive ion. **b** Metallic bonding **c** Electrostatic attraction between the positive sodium ions and the delocalised electrons **Sodium chloride** **a** The diagram should show alternating positive sodium ions, Na^+ and negative chloride ions, Cl^- (the larger ion is Cl^-). **b** ionic bonding **c** electrostatic attraction between the positive sodium ions and the negative chloride ions **Chlorine** **a** The diagram should show two chlorine atoms bonded together for each molecule. **b** Covalent bonding between the atoms in the molecule and weak bonding between the molecules **c** Electrostatic attraction between the shared electrons and the positive nuclei of the two atoms (also weak electrostatic attraction between the neutral molecules that act as instantaneous dipoles (see Chapter 4))
3	**a** Ionic bonding **b** Ionic bonding **c** Covalent bonding
4	The compound consists of Z^+ and X^{3-} ions so element Z is in group 1 and element X in group 15.
5	N will react by gaining 3 electrons and X by gaining 1 electron, so the formula will be NX_3
6	The telluride ion must be Te^{2-}, so tellurium is from group 16.
7	 

Review of strong bonding

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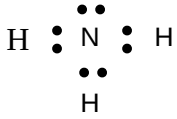
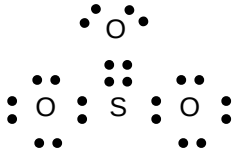
a



b



c

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Anions are larger than their parent atoms (due to increased electron repulsions), while cations are smaller than their parent atoms (due to a reduction in the number of occupied electron shells). Atomic radius decreases across a period in the periodic table. Atom/ion size increases as the number of occupied electron shells increases.

No.	First particle	>, =, <	Second particle
a	Sulfur atom (S)	<	Sulfide ion (S^{2-})
b	Hydrogen ion (H^{+})	<	Hydrogen atom (H)
c	Chloride ion (Cl^{-})	>	Fluoride ion (F^{-})
d	Magnesium atom (Mg)	>	Aluminium atom (Al)