# ChemThink: Ionic Bonding

Name KEY Per___

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2 When two negative ions get close to each other they push away / repel

3 When a positive and a negative ion get close to each other they attract / stick together

4 Charges that are alike will each repel other; opposite charges will attract and stick to each other

5 In order to build an ionic compound, you must have both a positive ion and a negative ion.

6 The positive ion will be formed from an atom that has a tendency to LOSE electrons and will usually be a metal.

7 A negative ion will be formed from an atom that has a tendency to GAIN electrons and will usually be a nonmetal.

8 Conclusion: metals and nonmetals can bond together by forming an ionic bond.

**Sodium and Chlorine Ionic Bond**

10 Chlorine atoms have a strong attraction for electrons

10 A chlorine atom can take (1) / 2 (circle one) electrons from a sodium atom

11 The two ions are held together by the (attraction) / repulsion (circle one) between the opposite charges; this is called an ionic bond

14 Chlorine is a gas made up of atoms found in pairs, and has the formula $Cl_2$

14 Sodium exists as a solid made of 1 atoms.

15 Each chlorine atom in the $Cl_2$ molecules needs 1 sodium atom to react with.

16 The end result is that each $Na^+$ ion is bonded to a $Cl^-$ ion

19 The ion pairs attract other pairs and the crystal grows in three dimensions until no more ion pairs are nearby

**Sodium and Chlorine Formula**

22 Since there is 1 sodium ion for every chloride ion, the ions are in a 1 to 1 ratio

22 The formula is written NaCl.

23 There are no molecules in this ionic crystal. The formula tells you the ratio of the ions, not the total number.

**Calcium Fluoride**

24 Since there are 4 calcium ions to 8 fluoride ions, this reduces to a 1 : 2 ratio

24 The formula for calcium fluoride is $CaF_2$.

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# ChemThink: Ionic Formulas

3 Noble Gases never form ions because their electrons are already in a very stable state.

3 Atoms react with each other to become more stable.

4 Atoms form ions that have the same number of electrons as noble gases. This fact can be used to predict the charge of an ion.

15 In order to form an ionic compound we will need to have one atom that can lose electrons (positive ion) and one atom that can gain electrons (negative ion.)

19 When sodium loses an electron what happens to the size of the blue atom? decreases

19 When chlorine gains and electron what happens to the size of the green atom? increases

22 When oxygen gains 2 electrons what happens to the size of the red atom? increases

16 When atoms react to form ionic compounds the total number of electrons that are lost must always be equal to the total number of electrons that are gained.

24 Formula: $CaF_2$

| + ion | - ion |
|---|---|
| $Ca^{2+}$ | $F^-$, $F^-$ |
| Total: +2 | Total: −2 |

26 Formula: $Li_3N$

| + ion | - ion |
|---|---|
| $Li^+$, $Li^+$, $Li^+$ | $N^{3-}$ |
| Total: +3 | Total: −3 |

28 Formula: $Al_2S_3$

| + ion | - ion |
|---|---|
| $Al^{3+}$, $Al^{3+}$ | $S^{2-}$, $S^{2-}$, $S^{2-}$ |
| Total: +6 | Total: −6 |