Topic	Dot and cross diagrams for ionic bonding	Level	GCSE (or any course for students aged 14-16)
Outcomes	1. To draw dot and cross diagrams for ionic compounds		

Winners and Losers: Ionic Bonding

When metals and non-metals react electrons are transferred from the metal to the non-metal to from ions. The ions formed have full outer shells.

Draw dot and cross diagrams to show how electrons are transferred when the following atoms react:

1 atom of sodium with 1 atom of chlorine:

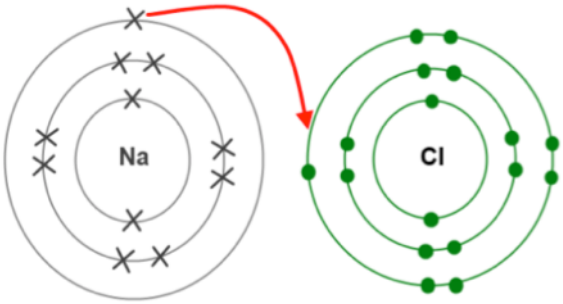
WORKED EXAMPLE

Step 1 Draw the electronic arrangement of both atoms (use dots for one atom and crosses for the other)

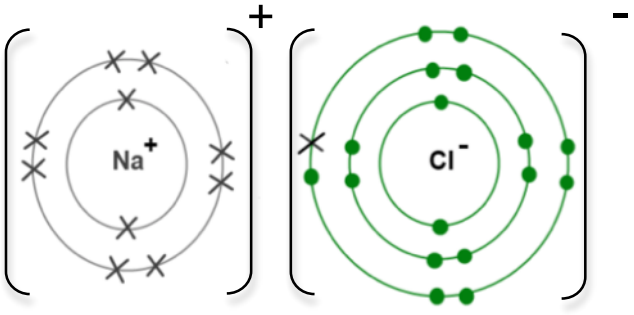
Step 2 Now draw an arrow on your diagram to show the direction of the transfer of the electron(s)

Step 3 Now draw the ions formed after the electrons have moved: show the charge on the ions formed **at the top right**.

Atoms before they react



Ions that are formed



Repeat steps 1-3 for the following atoms in your book. <u>Show only the outer electrons.</u>

1. 1 atom of lithium and 1 atom of chlorine
2. 1 atom of sodium and 1 atom of fluorine
3. 1 atom of magnesium and 1 atom of oxygen
4. 1 atom of potassium and 1 atom of fluorine
5. 1 atom of beryllium and 1 atom of sulphur
6. 1 atom of magnesium and two atoms of fluorine
7. 1 atom of calcium and two atoms of fluorine
8. 2 atoms of sodium and one of oxygen
9. 2 atoms of aluminium and 3 atoms of oxygen

Questions (please write out the question):

1. What is the difference between a sodium atom and a sodium ion?
2. Do metal atoms lose or gain electrons?
3. How many valence electrons does an atom of chlorine have?
4. What charge ions will atoms in group 7 of the Periodic table form?
5. For metals, what is the relationship between the group number and the charge on the ion?
6. For non-metals, what is the relationship between the group number and the charge on the ion?
7. How many atoms of sodium would react with an atom of fluorine, explain your answer.
8. How many atoms of sodium would react with an atom of oxygen, explain your answer.
9. Why are electrons drawn with different symbols for each atom?

Progress: further resources on bonding are available here:
http://www.thescienceteacher.co.uk/bonding/