



Atoms and ions: knowledge check

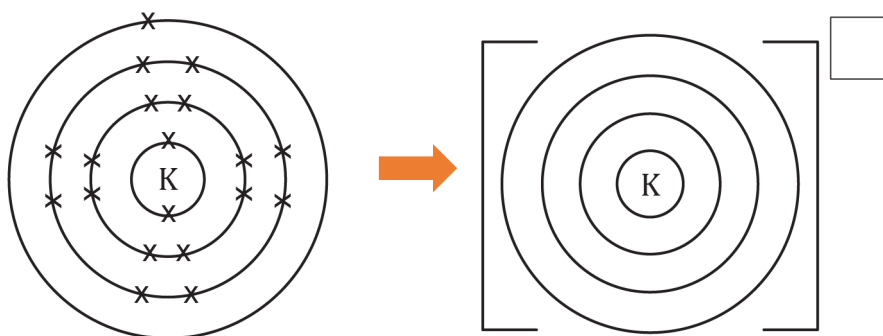
Metal ions

1.1 Describe how a metal atom forms an ion.

1.2 Using a periodic table, complete the table to describe metal ions:

Element	Group	No. of electrons in outer shell	No. of electrons removed to give a full outer shell	Ion charge
K				
Mg				
Al				
Na				

1.3 Complete the diagram to show how a potassium atom becomes a potassium ion. Use a cross (x) to show the electrons.



Electronic configuration

_____/_____/_____/_____
potassium atom

_____/_____/_____/_____
potassium ion

1.4 Explain why a metal ion becomes positive when it loses electrons. Refer to sub-atomic particles in your answer.



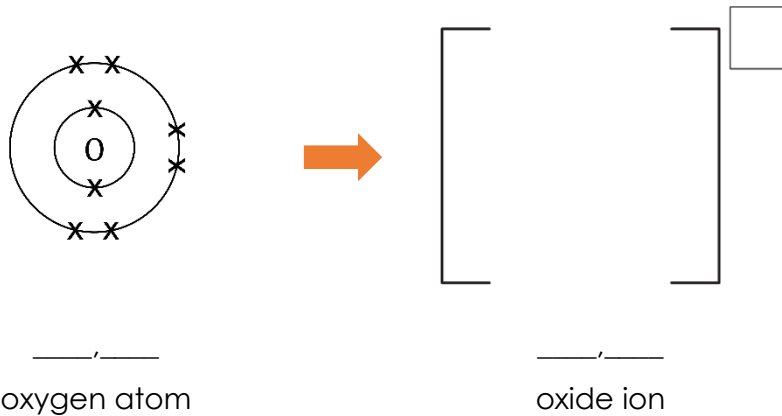
Non-metal ions

1.5 Describe how a non-metal atom forms an ion:

1.6 Use a periodic table to complete the table to describe non-metal ions:

Element	Group	No. of electrons in outer shell	No. of electrons added to give a full outer shell	Ion charge
O				
Cl				
N				

1.7 Complete the diagram to show how oxygen becomes an **oxide** ion. Use a cross (x) to show original electrons and a dot (•) to show any additional electrons.



1.8 Explain why a non-metal ion becomes negative when it gains electrons. Refer to sub-atomic particles in your answer.



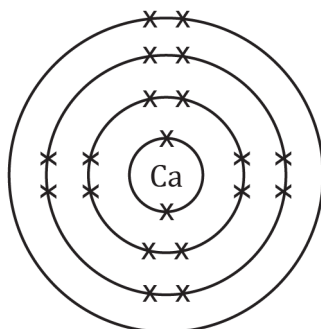
Atoms and ions: test myself

2.1 Identify which group the following elements are in using a periodic table. Work out if **electrons** are **lost** or **gained** and **what charge** ion is made when the atom forms an ion.

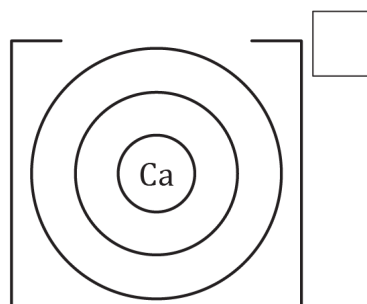
Name of element	Group	Number of electrons in the outer shell	Lose or gain electrons, and how many?	Charge on ion
Lithium				
Sulfur				
Calcium				
Aluminium				
Fluorine				

2.2 Use the information from the table above to complete the electrons and add the charge for the following ions:

(a)

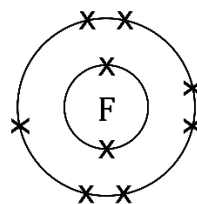


calcium atom

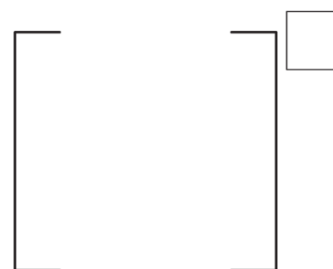


calcium ion

(b)

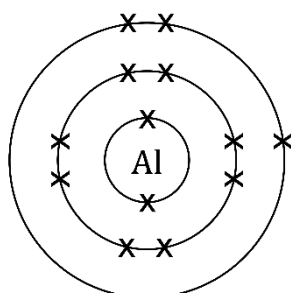


fluorine atom



fluoride ion

(c)



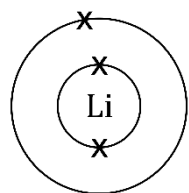
aluminium atom



aluminium ion



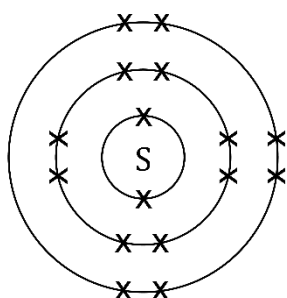
(d)



lithium atom

lithium ion

(e)



sulfur atom

sulfide ion

2.3 Use the periodic table, and the group number of that the atom is found in, to give the symbol of these ions showing their charge. The first one is completed for you.

Name of ion	Symbol
Calcium ion	Ca^{2+}
Chloride ion	
Sodium ion	
Aluminium ion	
Oxide ion	



Atoms and ions: feeling confident?

3.1 When a metal atom makes an ion the atom and ion both use the name of the element. When a non-metal atom makes an ion the ending of the element name is changed.

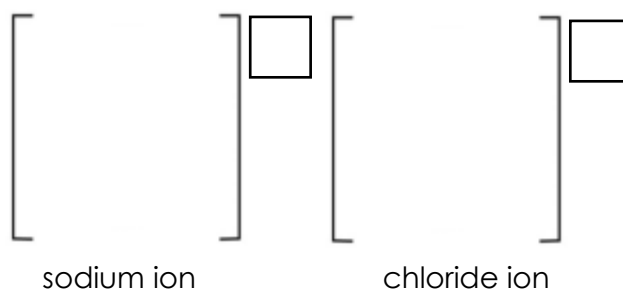
(a) What does the non-metal ion name end with?

(b) Complete the table below to name the metal and non-metal ions:

Ion symbol	Name of atom	Metal or non-metal?	Name of ion
N^{3-}			
Li^+			
S^{2-}			
Al^{3+}			
Cl^-			

3.2 An ionic compound is made up of positive ions attracted to negative ions to bonds.

(a) Complete the electrons and charge to show a sodium ion and a chloride ion side by side. Draw the electrons on the outer shell of the metal as dots and non-metal as crosses. This is called a dot and cross diagram.



(b) When you draw the ions side by side like this, they represent the compound sodium chloride. Is sodium chloride neutral or charged? Explain.



- 3.3** If you know what group an atom is in (using groups 1, 2, 3, 5, 6, 7) then you can predict the charge of the ion. Complete the table by using a periodic table. The first row is done for you.

Name of atom	Symbol of atom	Group number of atom	Symbol and charge of ion
Rubidium	Rb	1	Rb ⁺
Selenium			
Gallium			
Iodine			
Strontium			



Atoms and ions: what do I understand?

Think about your answers and confidence level for each mini-topic. Decide whether you understand it well, are unsure or need more help. Tick the appropriate column.

Mini-topic	I understand this well	I think I understand this	I need more help
I can describe how a metal atom and a non-metal atom form ions.			
I can use the periodic table to determine how many electrons are in the outer shell of an element.			
I can use the group number to work out how many electrons need to be added or removed to give a full outer shell.			
I can work out the charges for metal and non-metal ions of the elements in groups 1, 2, 3, 5, 6 and 7.			
I can draw ions that have electrons in shells with brackets and charges.			
I can write the electron configuration of an atom and an ion.			
I can explain why an ion is positive or negative, referring to sub-atomic particles.			
Feeling confident? topics	I understand this well	I think I understand this	I need more help
I can name metal and non-metal ions.			
I can draw a dot and cross diagram for a simple ionic compound.			
I can apply my knowledge of the relationship between group number and charge to unfamiliar ions.			