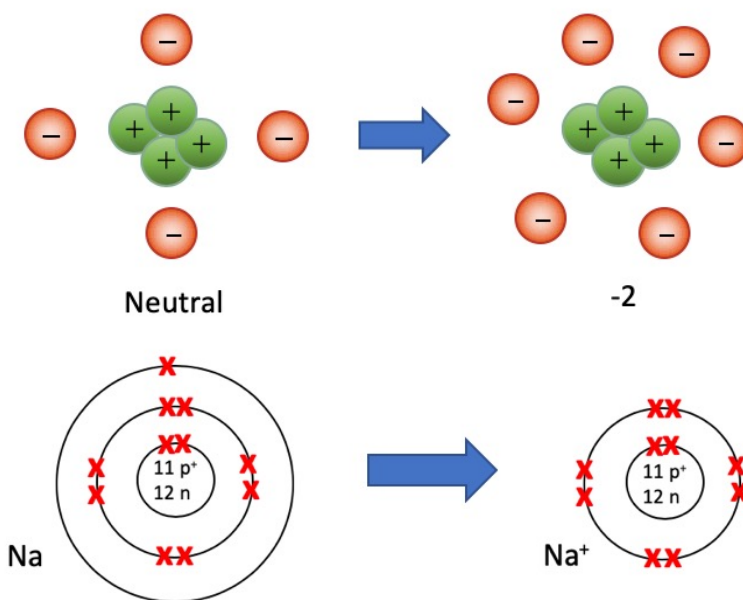


Ions



- Subatomic Particles
- Inside the Atom
- Atoms and Ions
- Knowing the Charge
- Bohr-Rutherford Ion Diagrams
- Multivalent Ions – Naming and Formula Writing
- Role of Ions



Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H																	2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn	
7	87 Fr	88 Ra	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo	
Lanthanides	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu			
Actinides	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr			

Preview File

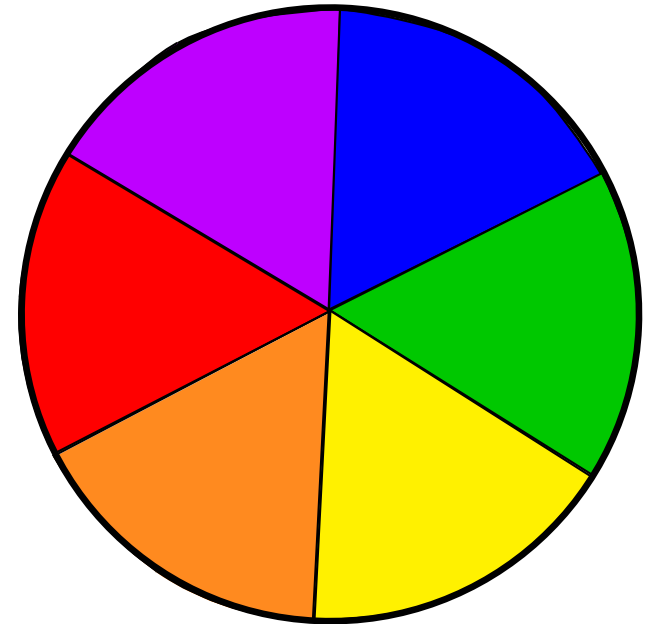
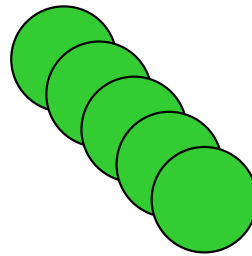
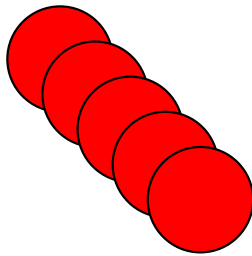
Please enjoy this preview of your Student Version of the presentation. Please note within this sample file:

- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

The paid full version of your resource includes both Google Slides and PowerPoint and is Google Classroom Ready

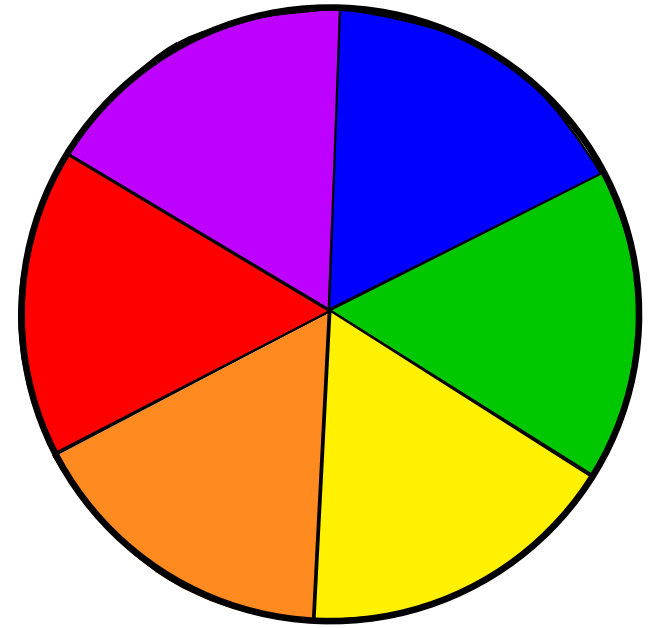
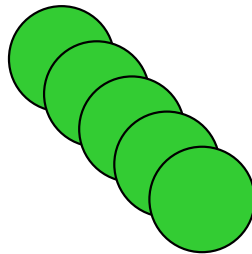
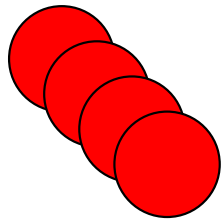


Ions



- Red and Green are opposites
- Since they are opposite to each other on the wheel, they cancel each other out
- Therefore, net color = _____

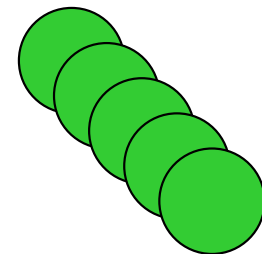
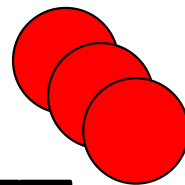
Check Your Understanding



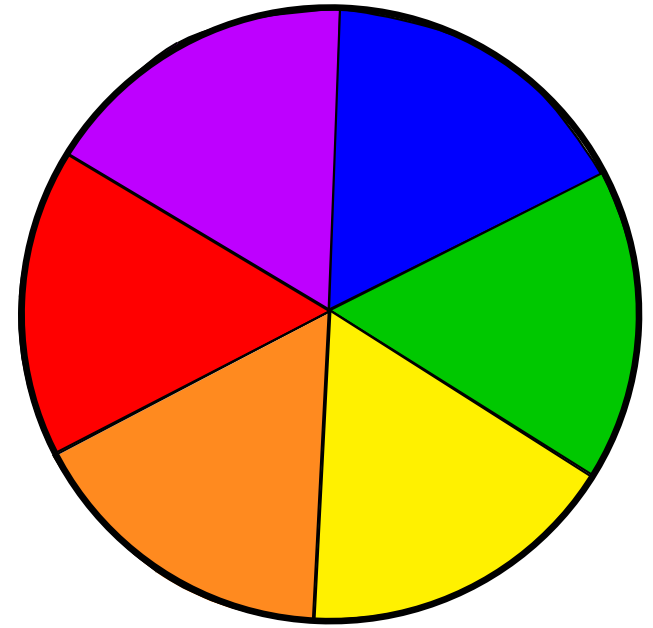
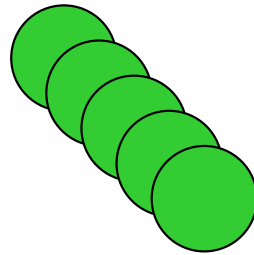
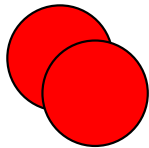
- Take away one red
- Net color = _____

- Take away two reds

- Net color = _____



Check Your Understanding

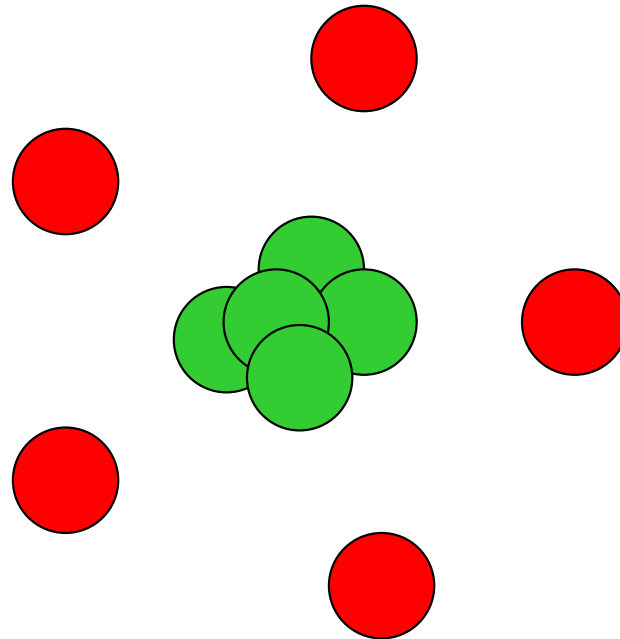


Net color?

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In this arrangement...

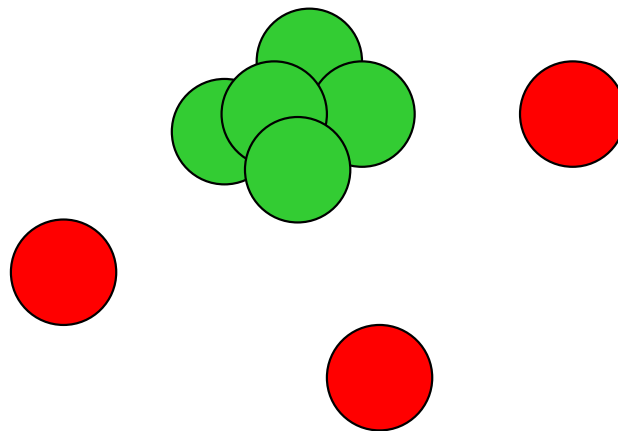
- Green is trapped inside.
- Only the red circles can be added or removed



Check Your Understanding

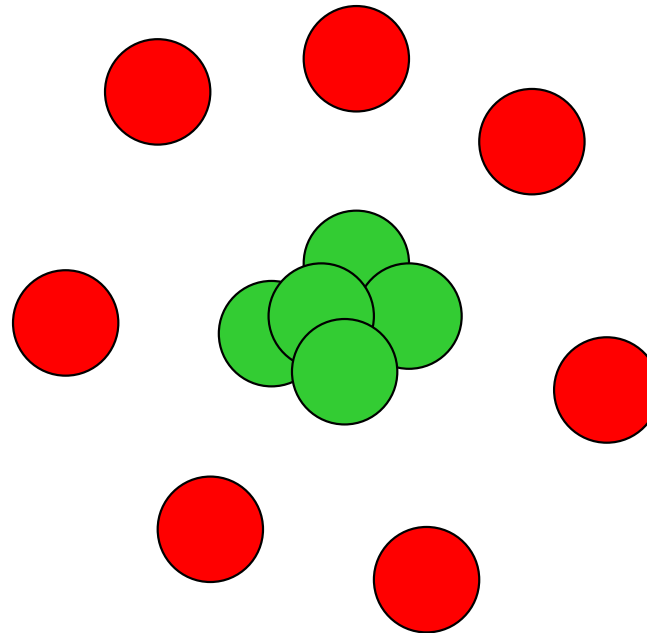
Take away two red

Net color = _____



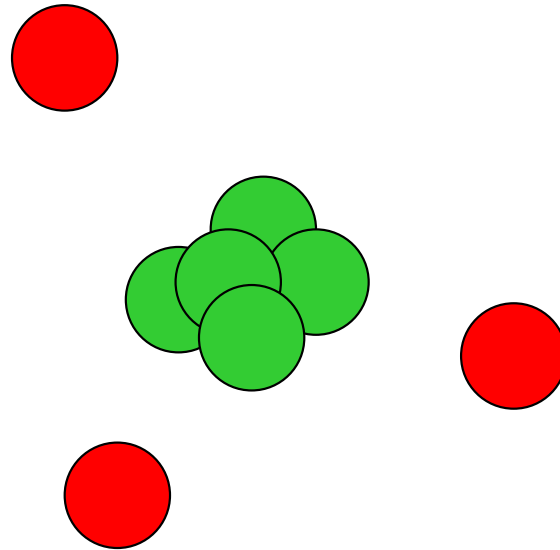
Check Your Understanding

Net color?



Check Your Understanding

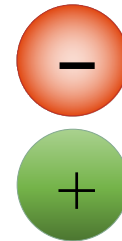
Net color?



What Does That Have To Do With Chemistry?

Recall – Subatomic Particles

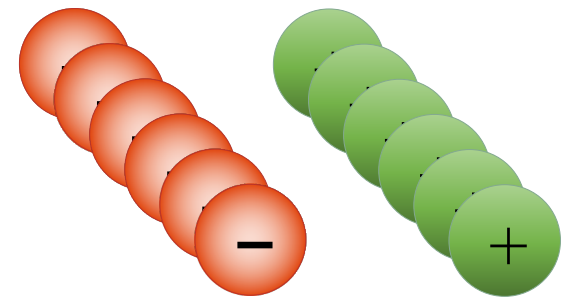
- ✓ _____
- ✓ _____
- ✓ _____



Atoms are composed of all three but when talking about ions, we're only concerned with electrons and protons.

What Does That Have To Do With Chemistry?

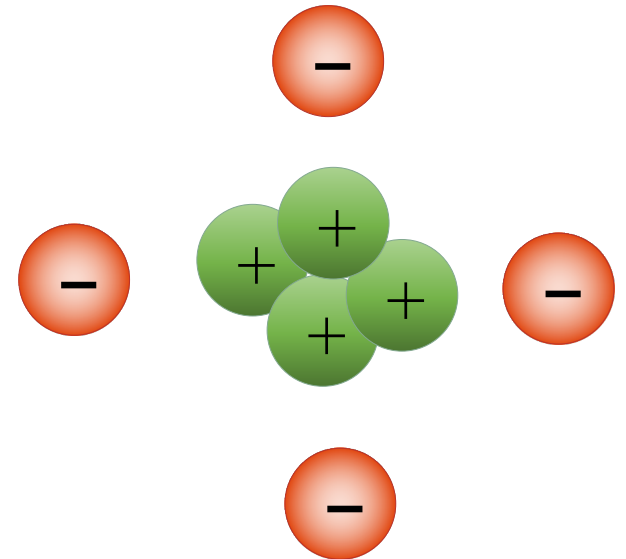
Since electrons and protons are oppositely charged, they cancel each other out.



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Inside The Atom

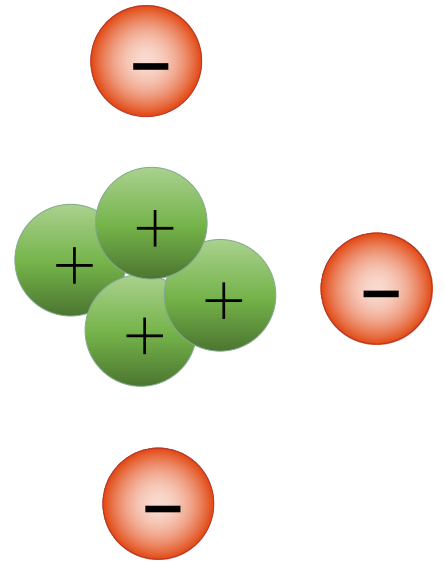
- This atom has 4 protons and 4 electrons
- It has 4 positive and 4 negative charges
- _____



Inside The Atom

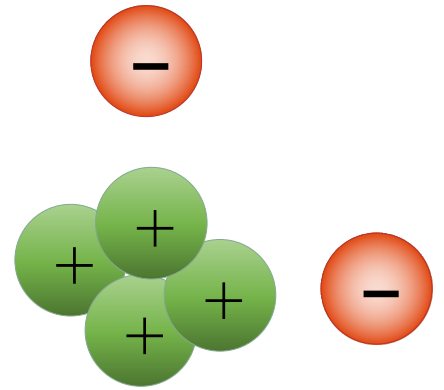
To find the net charge, add the number of positive charges and the number of negative charges. Make sure you don't change the signs.

$$= (+4) + (-3) = +1$$



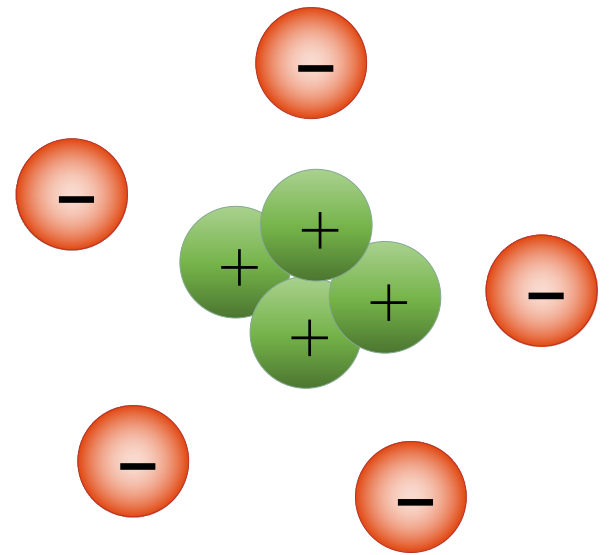
Check Your Understanding

To find the net charge, add the number of positive charges and the number of negative charges. Make sure you don't change the signs.



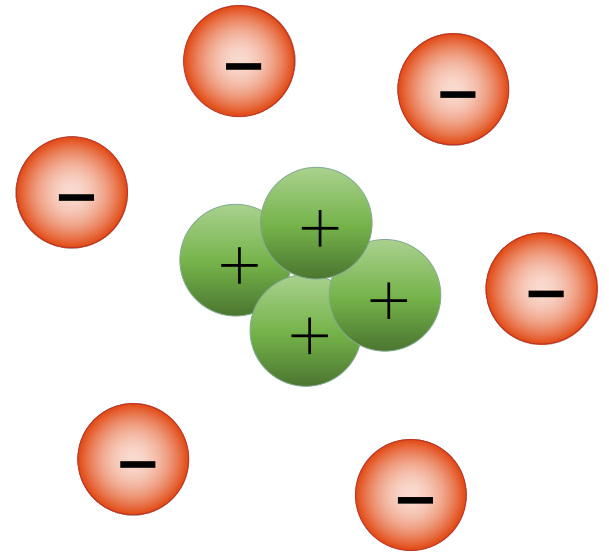
Check Your Understanding

To find the net charge, add the number of positive charges and the number of negative charges. Make sure you don't change the signs.

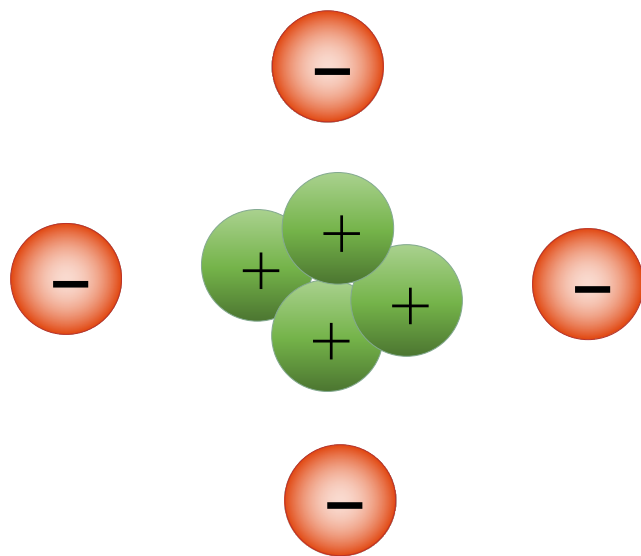


Check Your Understanding

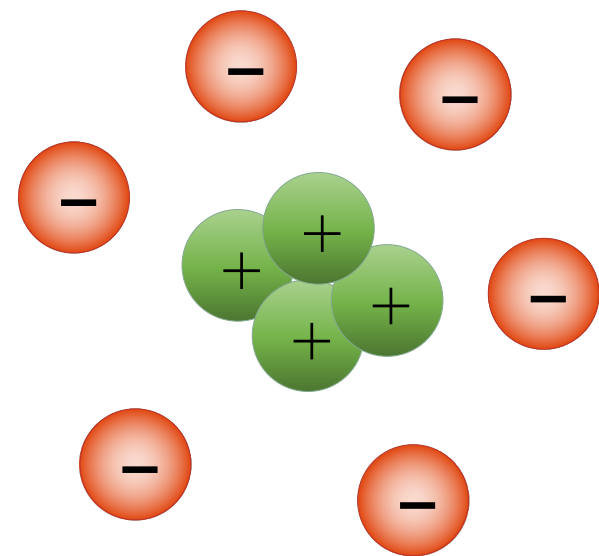
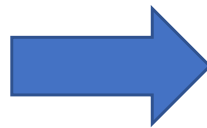
To find the net charge, add the number of positive charges and the number of negative charges. Make sure you don't change the signs.



Ions



Neutral



-2



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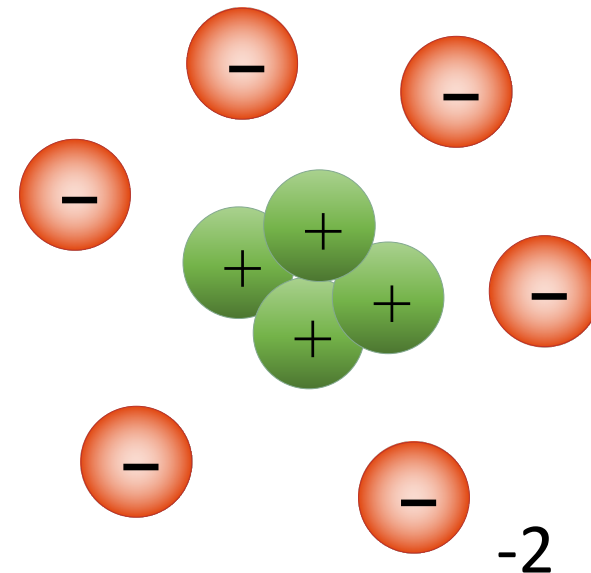
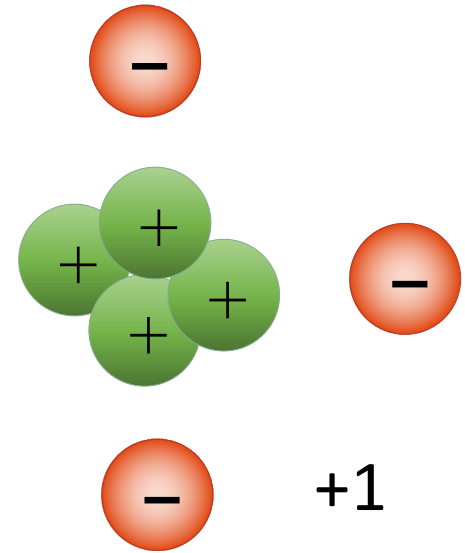
Atoms and Ions

- Atoms without a charge are called atoms

- _____

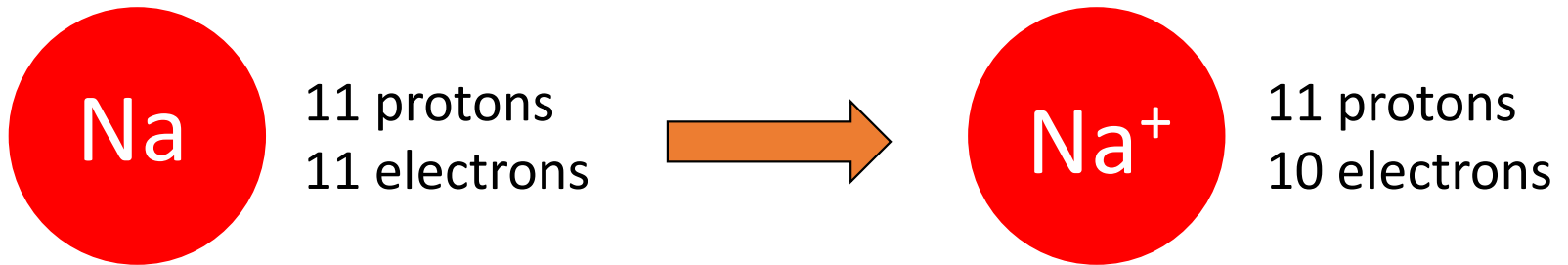
- The number of protons always stays the same

-

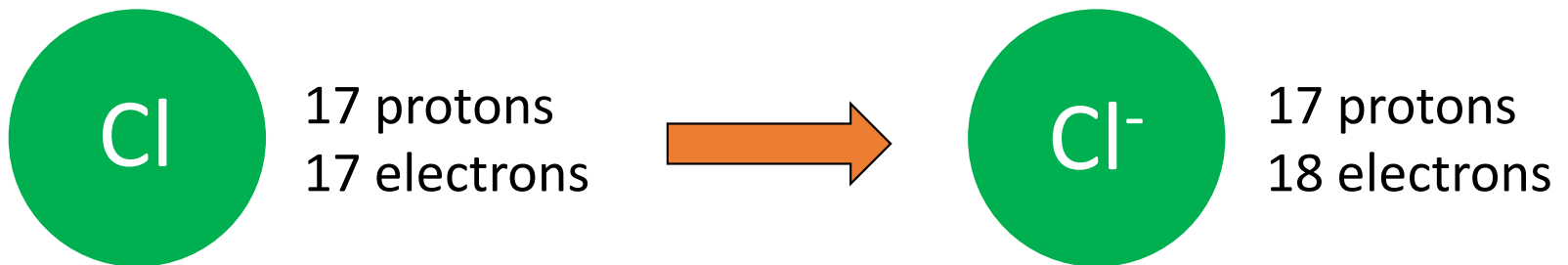


Ions

- If an ion loses one or more electrons, it becomes
-



- If an ion gains one or more electrons, it becomes
-

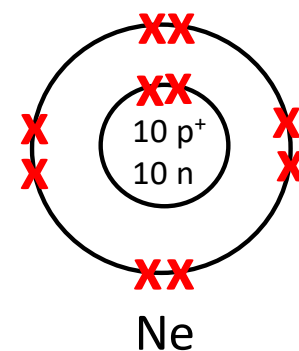
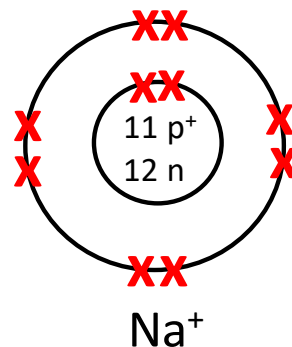
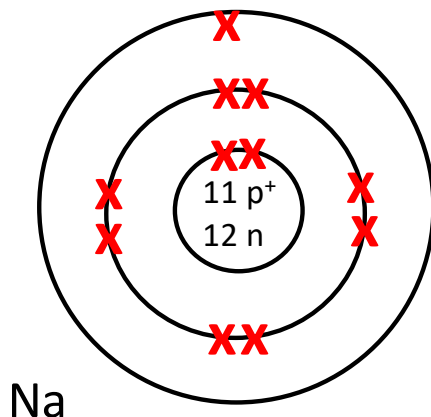


Ions

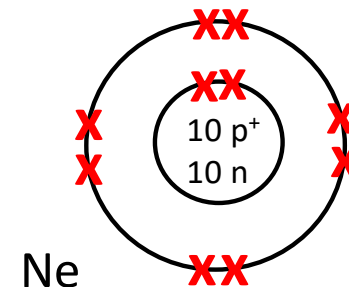
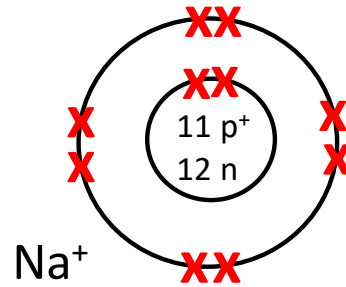
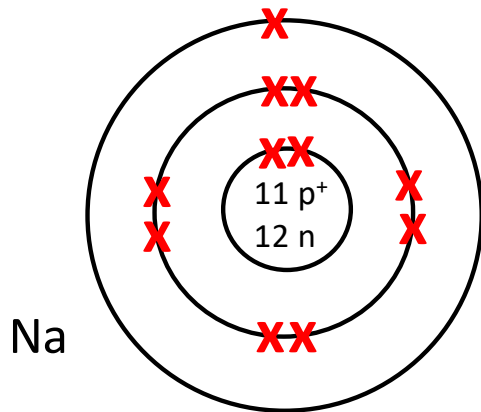
- How do we know what charge the ion will have?
- We need to look at the Bohr-Rutherford Diagram
- Most atoms will form ions to complete their outer orbit (energy level)
 - Note - Outer orbit electrons are called valence electrons

• _____

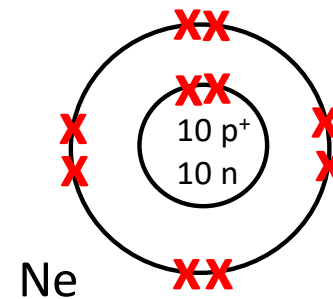
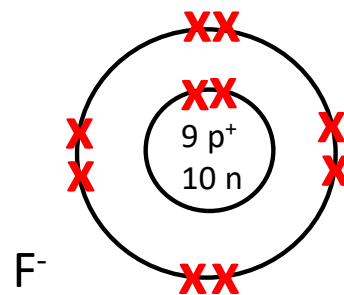
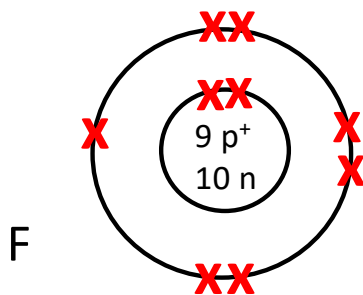
- Note – electrons are shown as “x” below but may also appear as circles



Ions



Sodium (Na) loses its one valence electron to become Na⁺. Notice that Na⁺ has the same configuration as Ne, a Noble Gas and is therefore, stable.



Fluorine (F)

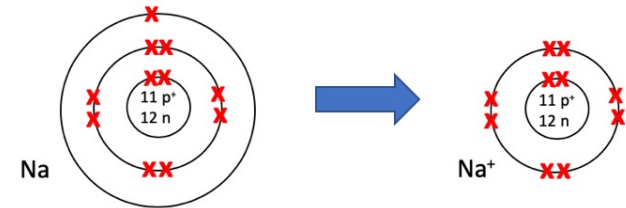
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How Do You Know?

It will be whatever is easier

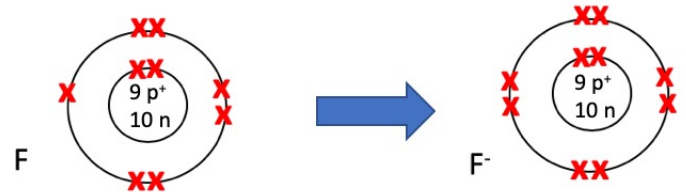
Cation:

- _____
- i.e. If it has 1 valence electron, it will lose 1 and lose its outer orbit → easier to lose 1 than gain 7



Anion:

- If it has



- _____

How Do You Know?

- Generally speaking, elements on the left (metals, metalloids, and hydrogen) will lose their valence electrons to form cations 
- Elements on the right will gain e^- to form anions 



The Shortcut

- Look at your periodic table
-
- Overtop of the groups write how many electrons they will lose or gain to have a complete outer orbit → 8 (or 2 for H)
- Write whether it will lose the electrons (+) or gain (-)
 - Remember, gaining electrons gives a “-” charge
- Example, Be – will lose two to shed its outer orbit = Be^{+2}

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Naming Ions

- ---
- ✓ i.e. Na^+ = Sodium ion
- ✓ i.e. Ca^{2+} = Calcium ion
- Negative Ions – The name is determined by removing the end and adding ide
 - ✓ i.e. O^{2-} = Oxygen ion = Oxide ion
 - ✓ i.e. P^{3-} = Phosphorus ion = Phosphide ion

Multivalent Ions



- Mostly involves transition metals (copper, iron, gold) but also includes tin (Sn), lead (Pb) as well as a few others

• _____

Group→	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
↓Period																		
1	1 H																	2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba		72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra		104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo
Lanthanides	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu			
Actinides	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr			

Multivalent Ions – Naming

- We can differentiate one version of the ion from another using roman numerals
- _____
- Multivalent ions include the name followed by the roman numeral in brackets
 - I.e. Cu^{4+} = Copper (IV) ion
 - I.e. Ni^{3+} = Nickel (III) ion
- Note: The

Multivalent Ions – Formulas

- The roman numeral in the name represents the charge on the ion

- I.e. Lead (IV) ion = Pb^{4+}

- I.e. Cobalt (II) ion = Co^{2+}

- ---

- Multivalent ions will always be positive

How Do Ions Impact You?

- Ions make up the salt you put on your food
- _____
- Ions keep you alive by controlling your pH
- Ions
- Ions are also called electrolytes that are found in sports drinks

