

Use with textbook pages 64–67.

## The number game with atoms and ions

- Complete the following sentences using the terms in parentheses.
  - The atomic \_\_\_\_\_ (number/mass) of an element is the same as the number of protons in the nucleus of an atom.
  - An \_\_\_\_\_ (atom/ion) of an element has the same number of protons as electrons.
  - A positively charged ion has \_\_\_\_\_ (lost/gained) electrons.
  - A negatively charged ion has \_\_\_\_\_ (lost/gained) electrons.
- Complete the following table. Some answers are provided to help guide you. You can refer to the Bohr model chart on page 32 and the periodic table on page 202.

Element name	Atomic number	Ion charge	Atom or ion?	Number of protons	Number of electrons
beryllium	4	2+	ion	4	2
	11	0	atom		
		0		18	18
chlorine		0			
	7	3–			10
calcium		0			
		2–		16	
	3	+			
		3+		13	

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## Drawing Bohr model diagrams

1. Refer to the Bohr model chart on page 32 to help you complete the following table. Some answers are provided for you. (Hint: Remember that the maximum number of electrons in the first three shells is 2, 8, and 8.)

Atom/ion	Atomic number	Number of protons	Number of electrons	Number of electron shells
neon atom	10	10	10	2
fluorine atom	9			
fluorine ion	9	9	10	2
sodium atom				
sodium ion			10	
argon atom				
chlorine atom				
chlorine ion			18	
potassium atom				
potassium ion			18	

2. Use the table above to draw the Bohr model diagram for the following atoms and ions.

Argon atom	Chlorine atom	Chlorine ion	Potassium atom	Potassium ion

3. What do you notice about the arrangement of electrons in the Bohr model of a neon atom, fluorine ion, and a magnesium ion?
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4. What would you expect to see with the arrangement of electrons in the Bohr model of an argon atom, chlorine ion, and a potassium ion?
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