

Review of Prerequisite Concepts

1. What is a valence electron?
2. How can you determine the number of valence electrons in an atom?

Key questions

4. How many valence electrons does a chloride ion have?
5. In general terms, what is the difference between an atom and an ion?
6. In general, how do metals form ions to achieve the stable noble gas configuration?
7. In general, how do nonmetals form ions to achieve the stable noble gas configuration?
8. What will happen when metals and nonmetals come into contact with each other?
9. Based on the number of valence electrons for each element, why don't elements in group 18 readily form compounds with other elements.

Exercises

1. Draw the dot diagram for an atom of potassium.
2. Draw the dot diagram for an atom of bromine.
3. In the compound potassium bromide, determine the charge on the potassium ion and the charge on the bromide ion.
4. Draw the dot diagrams for calcium and oxygen.
5. Based on the dot diagram for the atoms in Exercise 4, identify what you expect the charges on calcium ions and oxide ions to be when they form compounds. Explain your answer.
6. Draw the dot diagram for an atom of carbon.
6. Identify how carbon can attain the stable noble gas configuration of 8 electrons.
7. Indicate whether the following species have a stable noble gas configuration.

Rb	Ar
C ⁻⁴	Ca ⁺²
S	Cl ⁻¹
Fr ⁺¹	O ⁻²

Implementation Plan

Lewis Dot Structures of Atoms and Ions

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This lesson is designed to be used as a part of a regular or honors chemistry class. This will be done after the units on atomic structure and periodic trends are completed. Particular attention will be given to reviewing the loss of electrons by metals and the gain of electrons by nonmetals.

This lesson will be done in groups of four that are randomly assigned (as long as they are self-sufficient). The roles will be randomly assigned within the groups.

As part of the motivation/why a clip of sodium added to chlorine can be shown.

<http://jchemed.chem.wisc.edu/JCESoft/CCA/CCA0/Movies/NACL1.html>