

# CHEMICAL BONDS

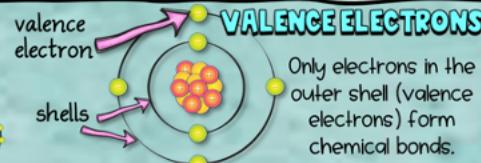
## CHEMICAL BONDS

- when two or more atoms combine
- the force that holds the atoms together

### ATOMS FORM CHEMICAL BONDS TO...

- complete their outer energy level.
- become more stable.

**OCTET RULE:**  
Octet means a group of eight.  
Simple chemical theory that states that atoms tend to combine in such a way that they each have eight electrons in their valence shells.



Each shell can only contain a certain number of electrons: the first layer can hold 2, the second and third layer can hold 8.

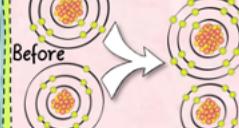
### How many valence electrons does each have?



## THREE MAIN TYPES OF BONDS:

ONE ATOM DONATES ELECTRON(S), THE OTHER ACCEPTS. A BOND IS FORMED BY ATTRACTION BETWEEN NEWLY FORMED IONS. OCCURS BETWEEN METAL AND NON-METAL IONS.

### IONIC



### COVALENT

TWO ATOMS SHARE ELECTRONS BETWEEN THEM. OCCURS BETWEEN TWO NON-METALS.

### METALLIC

ATOMS ARE CONNECTED BY A "SEA OF ELECTRONS" OCCURS ONLY BETWEEN METALS.

He  
Ne  
Ar  
Kr  
Xe  
Rn  
Og

Helium  
No gases are the most stable elements. They already have full energy levels.  
Argon & Krypton  
Neon lights

# doodle notes



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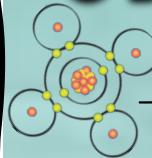
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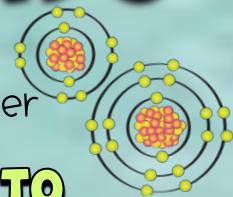
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# CHEMICAL BONDS



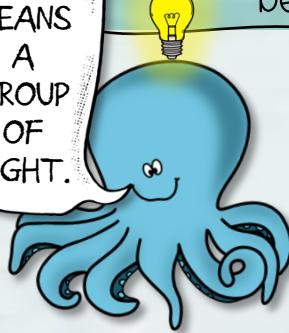
- when two or more atoms combine
- the force that holds the atoms together



## ATOMS FORM CHEMICAL BONDS TO...

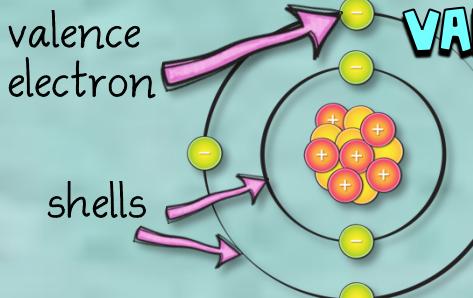
- complete their outer energy level.
- become more stable.

OCTET  
MEANS  
A  
GROUP  
OF  
EIGHT.



## OCTET RULE:

Simple chemical theory that states that atoms tend to combine in such a way that they each have eight electrons in their valence shells.

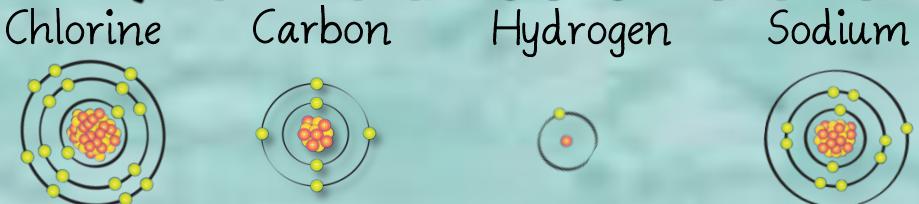


## VALENCE ELECTRONS

Only electrons in the outer shell (valence electrons) form chemical bonds.

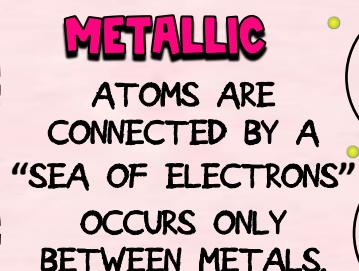
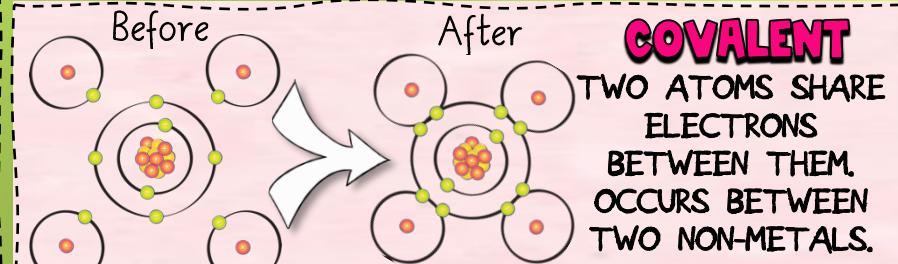
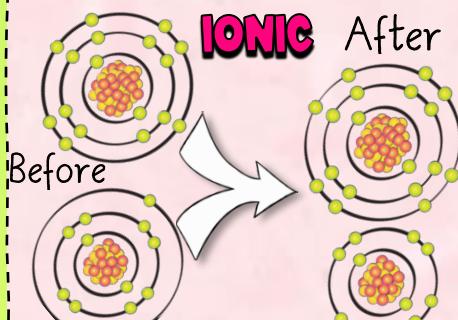
Each shell can only contain a certain number of electrons: the first layer can hold 2, the second and third layer can hold 8.

## How many valence electrons does each atom have?



## THREE MAIN TYPES OF BONDS:

ONE ATOM DONATES ELECTRON(S), THE OTHER ACCEPTS. A BOND IS FORMED BY ATTRACTION BETWEEN NEWLY FORMED IONS. OCCURS BETWEEN METAL AND NON-METAL IONS.



He  
Ne  
Ar  
Kr  
Xe  
Rn  
Og

Helium

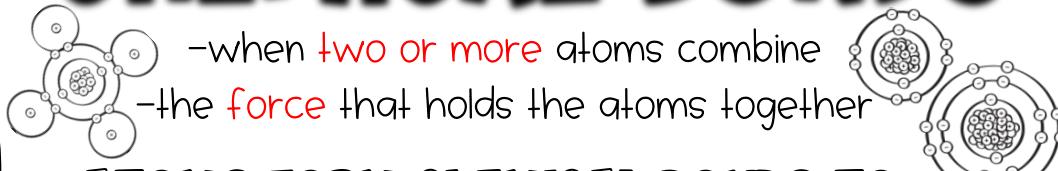
Noble gases are the most stable elements. They already have full energy levels.



Argon & Krypton

Neon LIGHTS

# CHEMICAL BONDS



-when two or more atoms combine

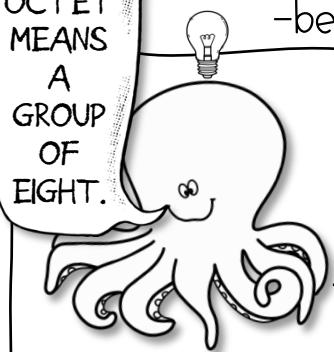
-the force that holds the atoms together

## ATOMS FORM CHEMICAL BONDS TO...

-complete their **outer** energy level.

-become more **stable**.

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A  
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Simple chemical **theory** that states that atoms tend to **combine** in such a way that they each have **eight** electrons in their **valence shells**.

valence  
electron

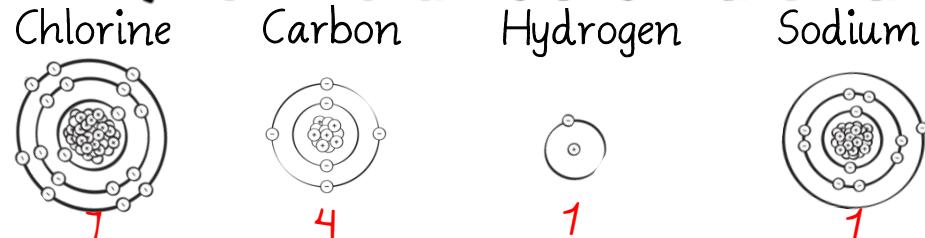
shells

## VALENCE ELECTRONS

Only electrons in the outer shell (**valence electrons**) form chemical bonds.

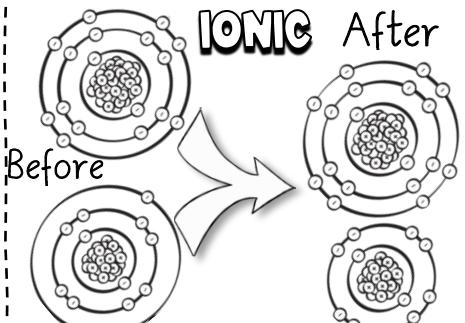
Each shell can only contain a **certain number** of electrons: the first layer can hold **2**, the second and third layer can hold **8**.

## How many valence electrons does each atom have?



## THREE MAIN TYPES OF BONDS:

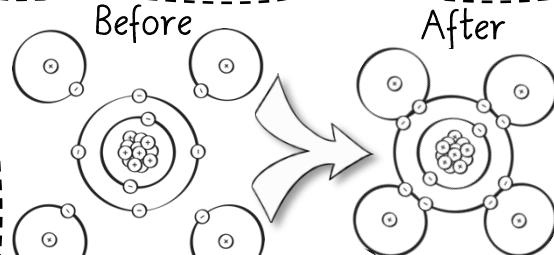
ONE ATOM DONATES ELECTRON(S), THE OTHER ACCEPTS. A BOND IS FORMED BY **ATTRACTION** BETWEEN NEWLY FORMED **IONS**. OCCURS BETWEEN **METAL** AND **NON-METAL** IONS.



### IONIC

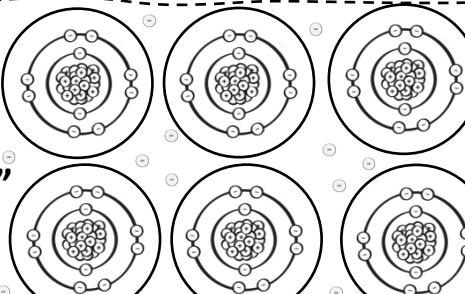
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TWO ATOMS **SHARE** ELECTRONS BETWEEN THEM. OCCURS BETWEEN TWO **NON-METALS**.



### METALLIC

ATOMS ARE CONNECTED BY A "SEA OF ELECTRONS" OCCURS ONLY BETWEEN **METALS**.



He
Ne
Ar
Kr
Xe
Rn
Og

Helium

Noble gases are the most stable elements. They already have **full** energy levels.



Argon & Krypton

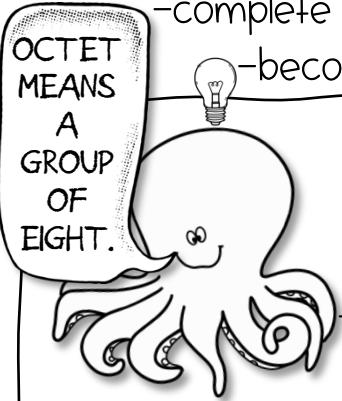
Neon LIGHTS

# CHEMICAL BONDS

-when \_\_\_\_\_ atoms combine  
-the \_\_\_\_\_ that holds the atoms together

# **ATOMS FORM CHEMICAL BONDS TO...**

- complete their \_\_\_\_\_ energy level.
- become more \_\_\_\_\_.



**OCTET RULE:** Simple chemical \_\_\_\_\_ that states that atoms tend to \_\_\_\_\_ in such a way that they each have \_\_\_\_\_ electrons in their \_\_\_\_\_ shells.

# THREE MAIN TYPES OF BONDS:

ONE ATOM  
ELECTRON(S), THE OTHER  
BY . A BOND IS FORMED  
BETWEEN

BY \_\_\_\_\_ BETWEEN  
NEWLY FORMED \_\_\_\_\_.  
OCCURS BETWEEN  
AND IONS.

A diagram illustrating cell division or cloning. In the center, a large cell contains a nucleus with multiple small circles representing chromosomes. Surrounding this central cell are several smaller, identical-looking cells, each with its own nucleus and chromosomes. A large, hand-drawn style arrow points from the left towards the central cell, indicating the direction of division or the source of the daughter cells.

**After**

**COVALENT**

**TWO ATOMS**

**ELECTRONS**

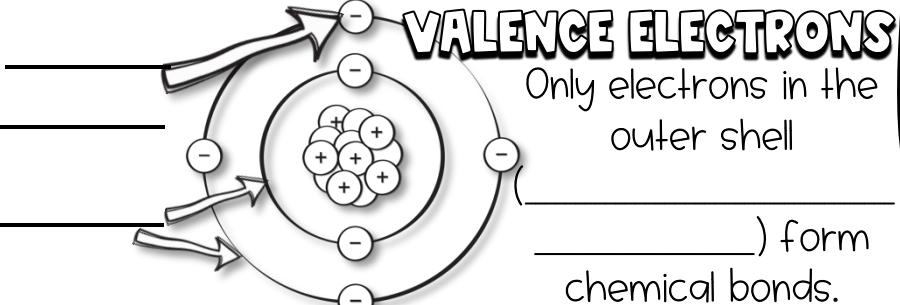
**BETWEEN THEM.**

**Occurs between**

**TWO**

A hand-drawn diagram showing two circles representing atoms. Inside each circle, there are smaller circles representing electrons. The two circles overlap significantly, indicating that electrons are shared between them.

**METALLIC**  
ATOMS ARE  
CONNECTED BY A  
“  
\_\_\_\_\_  
OCCURS ONLY  
BETWEEN



Each shell can only contain a \_\_\_\_\_ of electrons: the first layer can hold \_\_\_, the second and third layer can hold \_\_\_.

## **How many valence electrons does each atom have?**

## Chlorine      Carbon      Hydrogen      Sodium



## Helium

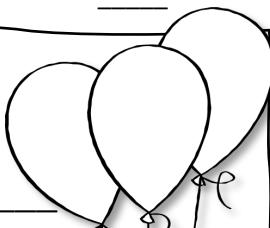
1

1

10

100

### Helium



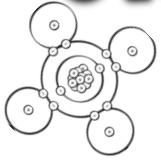
are the stable elements

They already have \_\_\_\_\_ energy levels.

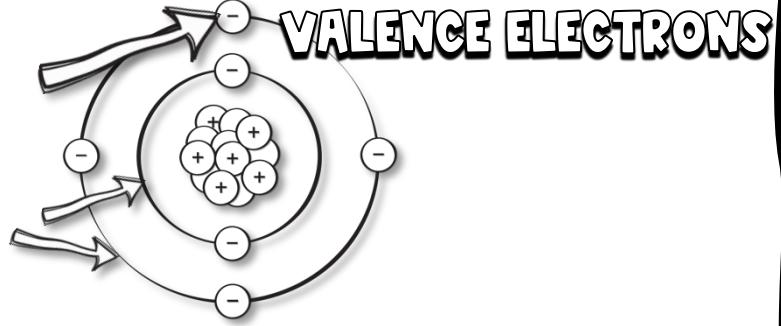


# Argon & Krypton

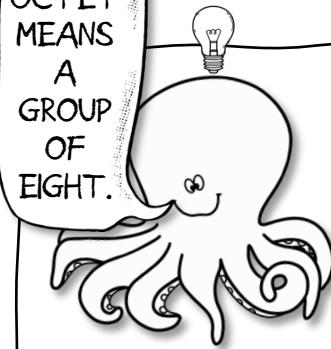
# CHEMICAL BONDS



ATOMS FORM CHEMICAL BONDS TO...



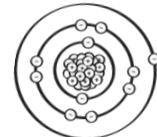
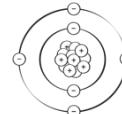
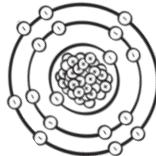
OCTET  
MEANS  
A  
GROUP  
OF  
EIGHT.



## OCTET RULE:

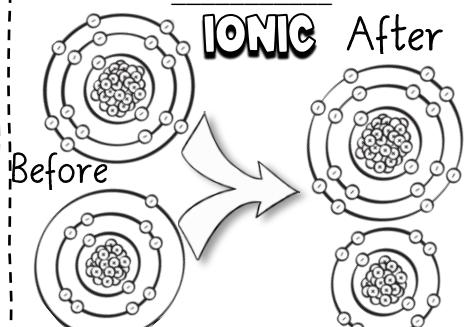
How many valence electrons does each atom have?

Chlorine      Carbon      Hydrogen      Sodium



## THREE MAIN TYPES OF BONDS:

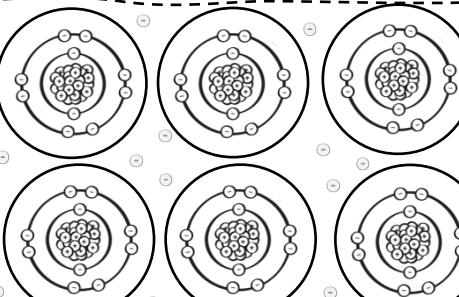
ONE ATOM  
ELECTRON(S), THE OTHER  
BY \_\_\_\_\_ A BOND IS FORMED  
NEWLY FORMED \_\_\_\_\_  
OCCURS BETWEEN \_\_\_\_\_  
AND \_\_\_\_\_ IONS.



Before                  After

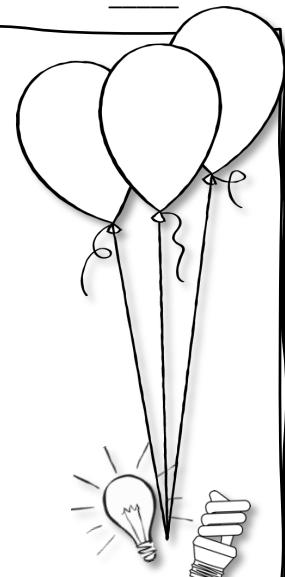
COVALENT  
TWO ATOMS  
ELECTRONS  
BETWEEN THEM.  
OCCURS BETWEEN  
TWO \_\_\_\_\_.

METALLIC  
ATOMS ARE  
CONNECTED BY A  
“ \_\_\_\_\_ ”  
OCCURS ONLY  
BETWEEN \_\_\_\_\_.



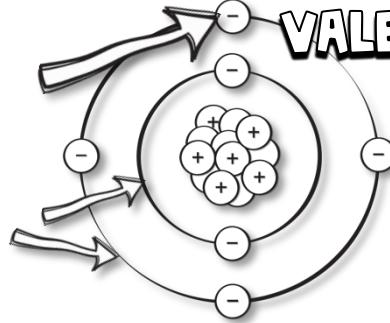
He  
Ne  
Ar  
Kr  
Xe  
Rn  
Og

Helium

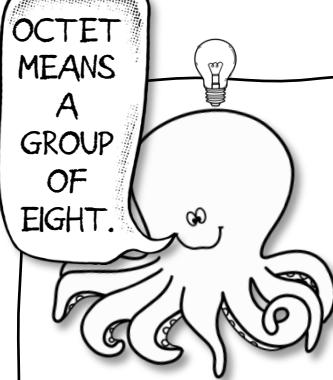


Argon &  
Krypton

# CHEMICAL BONDS



ATOMS FORM CHEMICAL BONDS TO...



## OCTET RULE:

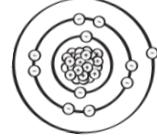
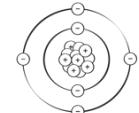
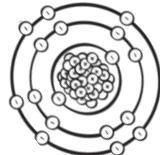
How many valence electrons does each atom have?

Chlorine

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Hydrogen

Sodium

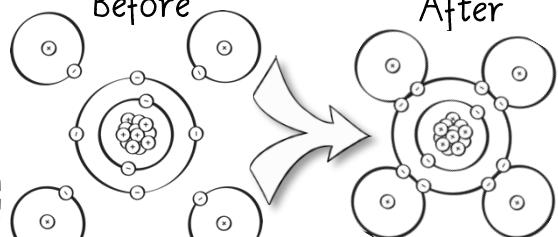


## THREE MAIN TYPES OF BONDS:

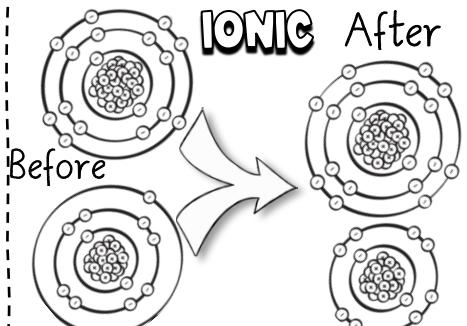
Before

After

COVALENT



METALLIC



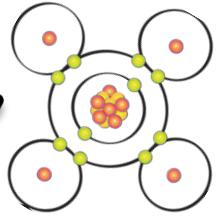
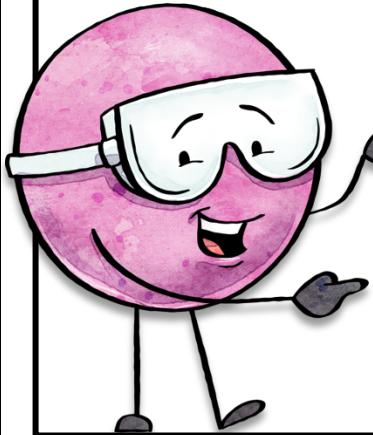
He
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Argon &  
Krypton

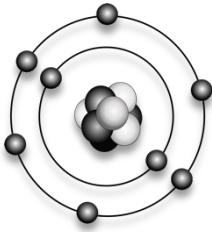
# Understanding Checkpoint ✓



## Chemical Bonds

1. Chemical bonds occur when \_\_\_\_\_ or more atoms combine.

2. How many valence electrons are represented here?



3. Which is involved in bonding?

- a. protons
- b. neutrons
- c. electrons
- d. valence electrons

4. In an ionic bond, electrons are \_\_\_\_\_.

- a. lost or gained
- b. shared
- c. shared or gained
- d. none correct

5. In a covalent bond, electrons are \_\_\_\_\_.

- a. lost or gained
- b. shared
- c. shared or gained
- d. none correct

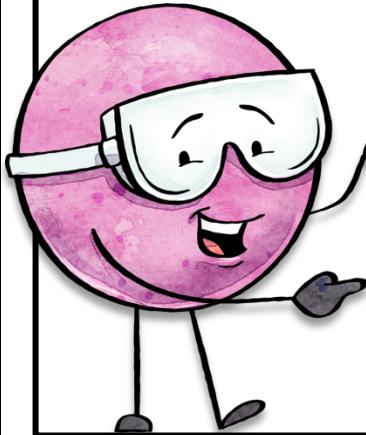
Name \_\_\_\_\_

Date \_\_\_\_\_

Period \_\_\_\_\_

6. Which of the following has a full valence shell?
  - a. Oxygen
  - b. Helium
  - c. Barium
  - d. Carbon
7. Typically, atoms are more stable when they are
  - a. bonded together.
  - b. apart from each other.
  - c. metal ions.
  - d. all of these
8. What two types of atoms make a covalent bond?
  - a. 2 Nonmetals
  - b. 1 Nonmetal and 1 Metal
  - c. 2 Metals
  - d. 2 Noble Gases
9. How many valence electrons does Neon have?
  - a. 2
  - b. 3
  - c. 8
  - d. 18
10. A metallic bond is a bond between
  - a. valence electrons and positively charged metal ions.
  - b. the ions of two different metals.
  - c. a metal and nonmetal.
  - d. none of the above

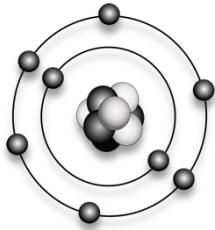
# Understanding Checkpoint



A diagram showing a molecular cluster. It consists of a central core of six red spheres arranged in a hexagonal pattern, surrounded by a ring of six green spheres, which is further surrounded by a ring of six blue spheres.

# Chemical Bonds

- Chemical bonds occur when 2 or more atoms combine.
  - How many valence electrons are represented here?  
6
  - Which is involved in bonding?
    - protons
    - neutrons
    - electrons**
    - valence electrons
  - In an ionic bond, electrons are  
lost or gained.
    - lost or gained**
    - shared
    - shared or gained
    - none correct
  - In a covalent bond, electrons are  
shared.
    - lost or gained
    - shared**
    - shared or gained
    - none correct



Name \_\_\_\_\_  
Date \_\_\_\_\_  
Period \_\_\_\_\_

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