Edgenuity

Warm-Up | Chemical Bonding

Lesson Question

Lesson Goals

Describe _____ bonds.

Explain why atoms _____ .

Identify the three _____ of bonds.

Create _____ diagrams.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

	the outermost shell of an atom
	the electrons in the outermost shell of an atom
	a push or pull on an object
	the rule that an atom needs eight valence electrons in its shell to become stable; the exceptions are hydrogen and helium, which need two electrons
	a force that holds atoms together
	a model of an atom showing the electrons in its valence shell

Warm-Up | Chemical Bonding

Atoms

An _____ is the smallest possible particle of an element.

- _____
  - _____ – positively charged
  - _____ – neutral
- Electron _____
  - _____ – negatively charged

Instruction | Chemical Bonding

Slide 2

Electron Shell Model

The electron _____ model of an atom shows:

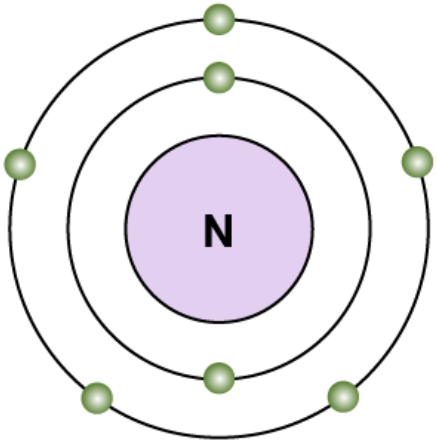
- the atom's _____ with its chemical symbol.
- the _____ levels, or _____, of an atom, represented by _____ around the nucleus.
- the _____ in each shell, represented by _____.

Electrons in the Outermost Shell

The _____ is the _____ shell (the shell farthest from the nucleus) of an atom.

The electrons found in the outermost shell of an atom are called _____.

Put an X on the valence shell in the model below.



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Slide 4

The Octet Rule: Full Valence Shells

- The _____ says that atoms need to have _____ valence shells to become stable.
  - Most atoms need _____ electrons to fill their valence shells.
  - Hydrogen and helium atoms need only _____ electrons to fill their valence shells.

The Octet Rule: Chemical Bonds

Atoms that do _____ have full valence shells form _____ with other atoms to fill their valence shells and satisfy the octet rule.

- Chemical bonds are forces that hold atoms _____.
- A _____ is a push or pull on an object.
- Nitrogen has 5 electrons in its valence shell. It is _____ electrons short of having a full valence shell. Nitrogen forms a chemical bond with other atoms to fill its valence shell to become _____.

Instruction | Chemical Bonding

Slide 7

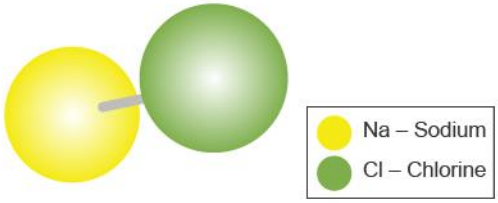
Types of Chemical Bonds

- The atoms that make up salt form _____ bonds.
- The atoms that make up sugar form _____ bonds.
- The atoms that make up aluminum foil form _____ bonds.

Ionic Bonds

Salt

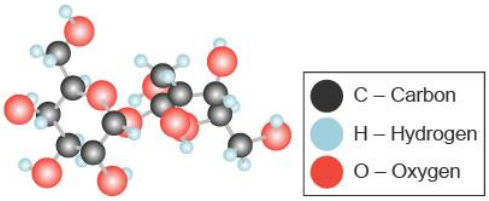
- Salt is made of _____ and _____ atoms.
- Sodium _____ an electron to chlorine.
- This leads to the formation of an _____ bond.



Covalent Bonds

Sugar

- Sugar is made of _____, _____, and _____ atoms.
- Carbon, hydrogen, and oxygen _____ electrons to form _____ bonds.



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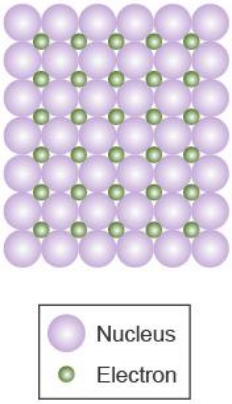
Slide 7

Metallic Bonds

Aluminum foil.

- Aluminum foil is made of _____ atoms.
- Many aluminum atoms share _____ electrons to form _____ bonds.



Slide 10

Electron Dot Diagrams

The _____ of an atom shows:

- the chemical _____ of the atom.
- the _____ in the valence shell, represented by _____.
- each dot represents _____ valence electron.

Electron dot diagram of _____

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Slide 10

Using the Periodic Table to Find the Number of Valence Electrons

The _____ of valence electrons of atoms of elements can be found on the periodic table.

- The _____ number represents the number of _____ electrons.
- Group 1A elements have _____ electron in their valence shells.
- Group 7A elements have _____ electrons in their valence shells.

Examples

- Sodium (Na) is in Group 1A. The number of valence electrons in Na is _____.
- Calcium (Ca) is in Group 2A. The number of valence electrons in Ca is _____.
- Aluminum (Al) is in Group 3A. The number of valence electrons in Al is _____.
- Carbon (C) is in Group 4A. The number of valence electrons in C is _____.

Instruction | Chemical Bonding

Slide 12

- Nitrogen (N) is in Group 5A. The number of valence electrons in N is [ ].
- Sulfur (S) is in Group 6A. The number of valence electrons in S is [ ].
- Iodine (I) is in Group 7A. The number of valence electrons in I is [ ].
- Krypton (Kr) is in Group 8A. The number of valence electrons in Kr is [ ].

Electron Dot Diagrams: Example

Create the [ ] diagram of neon.

- The chemical symbol of neon is [ ].
- Neon belongs to group [ ], so neon has [ ] valence electrons.

Draw the electron dot diagram of neon here:

Electron dot diagram of neon

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Slide 12

Electron Dot Diagrams: Strategy

[ ] in creating electron dot diagrams

- Use the periodic table to find the chemical [ ] and the number of [ ] in the [ ] shell of the atom.
- Write the chemical [ ] of the atom.
- Draw the dots one by one [ ] around the chemical symbol, starting at the [ ] of the chemical symbol, to represent the valence [ ] of the atom.
- [ ] the dots to make sure that [ ] of the valence electrons are represented.

Summary | Chemical Bonding

Lesson Question

What are chemical bonds?

Answer

Slide 2

Review: Key Concepts

CHEMICAL BONDS

- Chemical bonds hold _____ together.
- Atoms form chemical _____ to satisfy the octet rule and to become _____ .
  - Octet rule – _____ shells must be _____ to be stable (eight electrons for most atoms; two electrons for hydrogen and helium).
- There are _____ types of chemical bonds.
  - _____ bonds that involve the _____ of electrons
  - _____ bonds that involve the _____ of electrons
  - _____ bonds that involve the _____ of many electrons

Summary | Chemical Bonding

Slide 2

Review: Key Concepts

ELECTRON DOT DIAGRAMS

- Electron dot diagrams are [ ] that highlight the valence electrons of atoms.
- Follow these steps to [ ] an electron dot diagram.
  - Use the periodic table to find the chemical [ ] and the [ ] of electrons in the valence shell of the atom.
  - Write the chemical symbol of the [ ].
  - Draw the dots one by one [ ] around the chemical symbol, starting at the [ ] of the chemical symbol, to represent the valence [ ] of the atom.

[ ] the dots to make sure that [ ] of the valence electrons are represented.

Summary | Chemical Bonding

Use this space to write any questions or thoughts about this lesson.