

Name: _____

Date: _____

Period: _____

Ionic and Covalent Compound Review

Key

Periodic Table: Fill in the chart below

| | Symbol | Family Name | Valence Electrons | Oxidation Number |
|------------|--------|-------------------|-------------------|------------------|
| Potassium | K | Alkali | 1 | +1 |
| Phosphorus | P | Nitrogen | 5 | -3 |
| Bromine | Br | Halogen | 7 | -1 |
| Neon | Ne | Noble Gases | 8 | 0 |
| Copper | Cu | Transition Metals | 1, 2, 3 or 4 | +1, +2, +3, +4 |
| Magnesium | Mg | Alkaline Earth | 2 | +2 |
| Iron | Fe | Transition Metal | 1, 2, 3, or 4 | +1, +2, +3, +4 |
| Helium | He | Noble Gases | 8 | 0 |

Ionic vs Covalent: Write YES in the boxes that correctly apply to each specific bond.

| | Ionic Bonds | Covalent Bonds |
|---|-------------|----------------|
| Between metal and nonmetal | Yes | |
| Between 2 non metals | | Yes |
| High melting points | Yes | |
| Generally gas or liquid at room temperature | | Yes |
| Strong bonds | Yes | |
| Sharing electrons | | Yes |
| Use greek prefixes within names | | Yes |
| Use roman numerals when naming transition metals | Yes | |
| Can include transition metals | Yes | |
| Transferring electrons | Yes | |
| Drawn with arrows showing electron movement | Yes | |
| Drawn with lines to indicate electrons being shared | | Yes |
| Product is always a NEUTRAL compound, meaning oxidation numbers add up to zero. | Yes | |
| Conduct electricity when in solution | Yes | |
| Also called a molecule | | Yes |
| Generally a crystalline structure when solid | Yes | |

Answer the following questions:

1. Explain why some elements are stable on their own while other elements are more stable in compounds.
Some elements have 8 valence electrons, making them stable. Some elements need to form compounds to obtain the eight valence.
2. Explain why chemical bonding occurs.
Elements are trying to become stable (Rule of eight)
3. What is the difference between an element and a compound?
Elements are only one and compounds are made of many elements.
4. What kind of particle is formed by ionic bonds? Compound Covalent bonds? Molecules

Ionic vs Covalent Drawings: Figure out if it is: Ionic/Covalent, the Formula, and Lewis Dot Structure

| | |
|--|---|
| <p>Sodium fluoride</p> <p>Ionic/Covalent: <u>Ionic</u> Formula: <u>NaF₂</u></p> <p>Draw:</p>  | <p>Phosphorus trihydride</p> <p>Ionic/Covalent: <u>Covalent</u> Formula: <u>PH₃</u></p> <p>Draw:</p>  |
| <p>Oxygen Molecule (O₂)</p> <p>Ionic/Covalent: <u>Covalent</u> Formula: <u>O₂</u></p> <p>Draw:</p>  | <p>Barium Bromide</p> <p>Ionic/Covalent: <u>Ionic</u> Formula: <u>BaBr₂</u></p> <p>Draw:</p>  |
| <p>Copper (III) oxide</p> <p>Ionic/Covalent: <u>Ionic</u> Formula: <u>Cu₂O₃</u></p> <p>Draw:</p>  | <p>Dinitrogen trioxide</p> <p>Ionic/Covalent: <u>covalent</u> Formula: <u>N₂O₃</u></p> <p>Draw:</p>  |

| Compound Name: | Ionic/IonicTransition/Covalent? | Write the Formula: |
|--------------------------|---------------------------------|-------------------------|
| 1. Sodium fluoride | I | NaF |
| 2. Phosphorus trihydride | C | PH_3 |
| 3. Aluminum oxide | I | Al_2O_3 |
| 4. Carbon monoxide | C | CO |
| 5. Iron (III) chloride | IT | FeCl_3 |
| 6. Sodium Nitride | I | Na_3N |
| 7. Dinitrogen trioxide | C | N_2O_3 |
| 8. Copper (III) oxide | IT | Cu_2O_3 |
| 9. Dioxygen difluoride | C | O_2F_2 |
| 10. Nickel (II) oxide | IT | NiO |

| Compound Formula | Ionic/IonicTransition/Covalent? | Write the Formula: |
|----------------------------|---------------------------------|------------------------|
| 1. SO_2 | C | Sulfur dioxide |
| 2. Mg_3P_2 | I | Magnesium Phosphide |
| 3. ZnCl_2 | IT | Zinc (II) Chloride |
| 4. CO | C | Carbon monoxide |
| 5. Li_2O | I | Lithium oxide |
| 6. Cu_2O_3 | IT | Copper (III) oxide |
| 7. C_3H_8 | C | tri Carbon octahydride |
| 8. BaBr_2 | I | Barium Bromide |
| 9. NiO | IT | Nickel (II) oxide |
| 10. BrF_5 | C | Bromine pentafluoride |

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Mixed Ionic and Covalent Chemical Bonding Names and Formulas

- Ionic Bond between a Metal and Non-Metal (M + NM)
 - Covalent Bond between a Non-Metal and Non-Metal (NM + NM)
- Determine if the elements in the following compounds are metals or non-metals. Describe the type of bonding that occurs in the compound. Translate the names into formulas or formulas into names.

| Compound Formulas | Element Types | Bond Type | Name |
|------------------------------------|---------------|-----------|--------------------------------|
| 1. NO ₂ | NM + NM | Covalent | Nitrogen dioxide |
| 2. NaCl | M + NM | Metal | Sodium Chloride |
| 3. SO ₂ | M + NM | Metal | Sulfur dioxide |
| 4. PO ₄ | NM + NM | Covalent | Phosphorus tetroxide |
| 5. CaO | M + NM | Metal | Calcium monoxide |
| 6. H ₂ O | NM + NM | Covalent | dihydrogen monoxide |
| 7. K ₂ O | M + NM | Metal | Potassium oxide |
| 8. N ₂ | NM + NM | Covalent | Nitrogen gas |
| 9. NO ₂ | NM + NM | Covalent | Nitrogen dioxide |
| 10. MgBr ₂ | M + NM | Metal | Magnesium Bromide |
| 11. Rb ₂ S | M + NM | Metal | Rubidium Sulfide |
| 12. C ₄ H ₁₀ | NM + NM | Covalent | tetracarbon decahydride |
| Compound Names | Element Types | Bond Type | Formulas |
| 1. Calcium oxide | M + NM | Ionic | CaO |
| 2. Dinitrogen pentoxide | NM + NM | Covalent | N ₂ O ₅ |
| 3. Carbon dioxide | NM + NM | Covalent | CO ₂ |
| 4. Chlorine bromine | NM + NM | Covalent | ClBr |
| 5. Barium chloride | M + NM | Metal | BaCl ₂ |
| 6. Dicarbon hexahydride | NM + NM | Covalent | C ₂ H ₆ |
| 7. Strontium sulfide | M + NM | Metal | SrS |
| 8. Nitrogen trihydride | NM + NM | Covalent | NH ₃ |
| 9. Titanium I oxide | M + NM | Metal | Ti ₂ O |
| 10. Aluminum sulfide | M + NM | Metal | Al ₂ S ₃ |
| 11. Potassium phosphide | M + NM | Metal | K ₃ P |
| 12. Carbon monoxide | NM + NM | Covalent | CO |