### Section A: Complete the chart using a periodic table to help you.

<table>
<thead>
<tr>
<th>Element</th>
<th>Atomic Symbol</th>
<th>Total # of Electrons</th>
<th># of Valence Electrons</th>
<th># of Electrons Needed to Gain or Lose (to Fill Outer Shell)</th>
<th>Oxidation Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine</td>
<td>Cl</td>
<td>17</td>
<td>7</td>
<td>Gain 1</td>
<td>1-</td>
</tr>
<tr>
<td>Potassium</td>
<td>K</td>
<td>19</td>
<td>1</td>
<td>Lose 1</td>
<td>1+</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Mg</td>
<td>12</td>
<td>2</td>
<td>Lose 2</td>
<td>2+</td>
</tr>
<tr>
<td>Fluorine</td>
<td>F</td>
<td>9</td>
<td>7</td>
<td>Gain 1</td>
<td>1-</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Al</td>
<td>13</td>
<td>3</td>
<td>Lose 3</td>
<td>3+</td>
</tr>
<tr>
<td>Sodium</td>
<td>Na</td>
<td>11</td>
<td>1</td>
<td>Lose 1</td>
<td>1+</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>N</td>
<td>14</td>
<td>4</td>
<td>Gain 3</td>
<td>3-</td>
</tr>
<tr>
<td>Oxygen</td>
<td>O</td>
<td>8</td>
<td>6</td>
<td>Gain 2</td>
<td>2-</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>H</td>
<td>1</td>
<td>1</td>
<td>Gain or Lose 1</td>
<td>1+ or 1-</td>
</tr>
<tr>
<td>Carbon</td>
<td>C</td>
<td>6</td>
<td>4</td>
<td>Gain or Lose 4</td>
<td>4+ or 4-</td>
</tr>
<tr>
<td>Iodine</td>
<td>I</td>
<td>53</td>
<td>7</td>
<td>Gain 1</td>
<td>1-</td>
</tr>
</tbody>
</table>

### Answer these questions:
- An atom that gains one or more electrons will have a **NEGATIVE** charge.
- An atom that loses one or more electrons will have a **POSTIVE** charge.
- An atom that gains or loses one or more electrons is called an **ION**.
- A positive ion is called a **CATION** and a negative ion is called an **ANION**.
Section B: Ionic Bonds

**What is an ionic bond?**
- Atoms will transfer one or more **electrons** to another to form the bond.
- Each atom is left with a **complete** outer shell.
- An ionic bond forms between a **metal** ion with a positive charge and a **nonmetal** ion with a negative charge.

Example B1: Sodium + Chlorine

\[ \text{Na}^{1+} + \text{Cl}^{1-} \rightarrow \text{NaCl} \]

Example B2: Magnesium + Iodine

\[ \text{Mg}^{2+} + 2\text{I}^{1-} \rightarrow \text{MgI}_2 \]

Example B3: Potassium + Iodine

\[ \text{K}^{1+} + \text{I}^{1-} \rightarrow \text{KI} \]

Example B4: Sodium + Oxygen

\[ \text{Na}^{1+} + \text{Na}^{1+} + 2\text{O}^{2-} \rightarrow \text{Na}_2\text{O} \]

Example B5: Calcium + Chlorine

\[ \text{Mg}^{2+} + \text{Cl}^{1-} + \text{Cl}^{1-} \rightarrow \text{MgCl}_2 \]

Example B6: Aluminum + Chlorine

\[ \text{Al}^{3+} + 3\text{Cl}^{1-} + 3\text{Cl}^{1-} + \text{Cl}^{1-} \rightarrow \text{AlCl}_3 \]

**Challenge:** What are some other ionic bonds that can be formed by the elements you see? Write the chemical formula for the compound and its name.

*Answers will vary.*
Section C: Covalent Bonds

What is a covalent bond?
- Atoms share one or more electrons with each other to form the bond.
- Each atom is left with a complete outer shell.
- A covalent bond forms between two nonmetals.

Example C1: Hydrogen + Hydrogen

Example C2: 2 Hydrogen + Oxygen

Example C3: Chlorine + Chlorine

Example C4: Oxygen + Oxygen

Example C5: Carbon + 2 Oxygen

Example C6: Carbon + 4 Hydrogen