1. In your own words, explain how Rutherford's gold foil experiment proved that Thomson's plum pudding model of the atom was incorrect.

2. Complete the following table. Remember to fill in all three blanks in the "Symbol" column.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Element Name</th>
<th>Atomic Number</th>
<th>Number of Protons</th>
<th>Number of Electrons</th>
<th>Number of Neutrons</th>
<th>Mass Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Tungsten</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>110</td>
<td>184</td>
</tr>
<tr>
<td>Zr</td>
<td>Zirconium</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>52</td>
<td>92</td>
</tr>
<tr>
<td>K</td>
<td>Potassium</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>20</td>
<td>39</td>
</tr>
</tbody>
</table>

3. Write formulas based on the following names.
   a. Magnesium nitrate
      \[\text{Mg}(\text{NO}_3)_2\]
   b. Manganese(II) sulfate
      \[\text{Mn}_2\text{SO}_4\cdot\text{H}_2\text{O}\]
   c. Phosphorous trichloride
      \[\text{PCl}_3\]
   d. Sulfur trioxide
      \[\text{SO}_3\]

4. Write names based on the following formulas.
   a. AlF₃
      \[\text{AlF}_3\]
   b. BBF₅
      \[\text{BBF}_5\]
   c. Aluminum chloride
      \[\text{AlCl}_3\]
   d. Lithium nitride
      \[\text{Li}_3\text{N}\]

Continued on reverse.
5. State whether each compound in #4 is molecular (M) or ionic (I) by writing the appropriate letter next to your answer.

6. a. Calculate the average atomic mass of chlorine if the two most common isotopes of chlorine are $^{35}\text{Cl}$ (75.77%) with an atomic mass of 34.97 amu and $^{37}\text{Cl}$ (24.23%) with an atomic mass of 36.97 amu.

\[
\frac{(34.97 \text{ amu})(0.7577) + (36.97 \text{ amu})(0.2423)}{35.45 \text{ amu}} = 35.45 \text{ amu}
\]

b. If $1\text{ amu} = 1.661 \times 10^{-24}\text{ g}$, calculate the average atomic mass of chlorine in grams.

\[
35.45 \text{ amu} \left( \frac{1.661 \times 10^{-24}\text{ g}}{1\text{ amu}} \right) = 59.841 \times 10^{-23}\text{ g}
\]