

Name:  
Period:

## Building the Periodic Table from Scratch

### Introduction:

Before the periodic table could be built, the individual elements had to be found and their properties tested. Although elements such as gold, silver, tin, copper, lead and mercury have been known since antiquity, the first scientific discovery of an element occurred in 1649 when Henning Brand discovered phosphorous. During the next 200 years, a vast body of knowledge concerning the properties of elements and their compounds was acquired by chemists. By 1869, a total of 63 elements had been discovered. As the number of known elements grew, scientists began to recognize patterns in properties and began to develop classification schemes.

The Russian scientist, Mendeleev noticed patterns in the properties and atomic weights of the elements. In an effort to extend this pattern to other elements, he created a card for each of the 63 known elements. Each card contained the element's symbol, atomic weight and its characteristic chemical and physical properties. When Mendeleev arranged the cards on a table in order of increasing atomic weight and grouping elements of similar properties together in a manner not unlike the card arrangement in his favorite solitaire card game, the periodic table was formed. From this table, Mendeleev developed his statement of the periodic law and published his work *On the Relationship of the Properties of the Elements to their Atomic Weights* in 1869. The advantage of Mendeleev's table over previous attempts was that it exhibited similarities in an entire network of vertical and horizontal relationships. In 1906, Mendeleev came within one vote of being awarded the Nobel Prize for his work.


In this activity, you will use the same information they had to construct your own periodic table.

### Procedure:

- Work in teams.
- Pick up a grid.
- Obtain a stack of element cards.
- Without using a periodic table, arrange the elements in rows and columns in a logical manner on your grid so that:
  - atomic mass increases
  - elements having similar properties are grouped together
  - the "mystery element" is placed in the appropriate spot
- When you have your table done, write the name and symbol of each element in the box you placed it on in the grid.



<p>Lead</p> <p><b>Pb</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver</li> <li>-lustrous</li> <li>-very dense</li> <li>- multiple pure forms</li> </ul> <p>207</p>	<p>Nitrogen</p> <p><b>N</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-gas</li> <li>-colorless</li> <li>-stable</li> </ul> <p>14</p>	<p>Potassium</p> <p><b>K</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver</li> <li>-low density</li> <li>-bursts into flame in water</li> </ul> <p>39</p>	<p>Sodium</p> <p><b>Na</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver</li> <li>-low density</li> <li>-reacts vigorously with water</li> </ul> <p>23</p>	<p>Thallium</p> <p><b>Tl</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, gray-white</li> <li>-very dense</li> <li>-lustrous</li> </ul> <p>204</p>
<p>Lithium</p> <p><b>Li</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver</li> <li>-very low density</li> <li>-reactive in water</li> </ul> <p>7</p>	<p>Oxygen</p> <p><b>O</b></p> <ul style="list-style-type: none"> <li>-Nonmetal</li> <li>-gas</li> <li>-abundant</li> <li>-- multiple pure forms</li> </ul> <p>16</p>	<p>Rubidium</p> <p><b>Rb</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver</li> <li>-low density</li> <li>-reacts violently with water</li> </ul> <p>85</p>	<p>Strontium</p> <p><b>Sr</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver-white, lustrous</li> <li>-low density</li> <li>-reacts vigorously with water to form a base</li> </ul> <p>88</p>	<p>Tin</p> <p><b>Sn</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-hard, silver-gold</li> <li>- multiple pure forms</li> </ul> <p>119</p>
<p>Magnesium</p> <p><b>Mg</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver-white, lustrous</li> <li>-low density</li> <li>-reacts vigorously with hot water to form a base</li> </ul> <p>24</p>	<p>Phosphorous</p> <p><b>P</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-soft, white</li> <li>-- multiple pure forms</li> <li>-poisonous compounds</li> <li>-very reactive</li> </ul> <p>31</p>	<p>Selenium</p> <p><b>Se</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-solid</li> <li>- multiple pure forms</li> <li>-compounds with unpleasant odors</li> </ul> <p>79</p>	<p>Sulfur</p> <p><b>S</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-solid</li> <li>- multiple pure forms</li> <li>-compounds with obnoxious odors</li> </ul> <p>32</p>	<p>Xenon</p> <p><b>Xe</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-gas</li> <li>-very stable</li> </ul> <p>131</p>
<p>Neon</p> <p><b>Ne</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-gas</li> <li>-very stable</li> </ul> <p>20</p>	<p>Polonium</p> <p><b>Po</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-rare</li> <li>-radioactive</li> </ul> <p>209</p>	<p>Silicon</p> <p><b>Si</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-multiple pure forms</li> <li>-stable</li> </ul> <p>28</p>	<p>Tellurium</p> <p><b>Te</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-solid</li> <li>- multiple pure forms</li> <li>-compounds with obnoxious odors</li> </ul> <p>128</p>	<p>Radon</p> <p><b>Rn</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-gas</li> <li>-stable</li> <li>-rare</li> <li>-radioactive</li> </ul> <p>222</p>

<p>Aluminum</p> <p><b>Al</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver</li> <li>-abundant</li> <li>-doesn't occur in pure form</li> <li>-conductor</li> </ul> <p>27</p>	<p>Astatine</p> <p><b>At</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-man-made element</li> <li>-solid (?)</li> <li>-radioactive</li> </ul> <p>210</p>	<p>Boron</p> <p><b>B</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-rare</li> <li>-doesn't occur naturally in pure form</li> <li>-insulator</li> </ul> <p>11</p>	<p>Carbon</p> <p><b>C</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-abundant</li> <li>-- multiple pure forms</li> </ul> <p>12</p>	<p>Germanium</p> <p><b>Ge</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-rare</li> <li>-- multiple pure forms</li> </ul> <p>73</p>
<p>Antimony</p> <p><b>Sb</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-brittle, gray, lustrous</li> <li>-poor conductor</li> <li>-doesn't react with dilute acid</li> <li>-poisonous compounds</li> </ul> <p>122</p>	<p>Beryllium</p> <p><b>Be</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-dark</li> <li>-lustrous</li> <li>-rare</li> <li>-poor conductor</li> </ul> <p>9</p>	<p>Bromine</p> <p><b>Br</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-brown liquid</li> <li>-poisonous</li> <li>-reacts vigorously with metals to form salts</li> </ul> <p>80</p>	<p>Chlorine</p> <p><b>Cl</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-green gas</li> <li>-poisonous</li> <li>reacts violently with metals to form a salt</li> </ul> <p>35</p>	<p>Indium</p> <p><b>In</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, gray-silver</li> <li>-shiny</li> <li>-very rare</li> </ul> <p>115</p>
<p>Argon</p> <p><b>Ar</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-gas</li> <li>-very stable</li> </ul> <p>39</p>	<p>Barium</p> <p><b>Ba</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver-white</li> <li>-shiny</li> <li>-low density</li> <li>-reacts vigorously with cold water to form a base</li> </ul> <p>137</p>	<p>Calcium</p> <p><b>Ca</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-silver-white</li> <li>-low density</li> <li>-shiny</li> <li>-reacts vigorously with water to form a base</li> </ul> <p>40</p>	<p>Fluorine</p> <p><b>F</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-green gas</li> <li>-poisonous</li> <li>-reacts violently with metals to form a salt</li> </ul> <p>19</p>	<p>Iodine</p> <p><b>I</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-solid</li> <li>-violet</li> <li>-reacts easily with metals to form salts</li> </ul> <p>127</p>
<p>Arsenic</p> <p><b>As</b></p> <ul style="list-style-type: none"> <li>-metalloid</li> <li>-gray</li> <li>-lustrous</li> <li>- multiple pure forms</li> <li>-reactive</li> <li>-poisonous compounds</li> </ul> <p>75</p>	<p>Bismuth</p> <p><b>Bi</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-lustrous</li> <li>-brittle</li> <li>- multiple pure forms</li> <li>-conductor</li> </ul> <p>209</p>	<p>Cesium</p> <p><b>Cs</b></p> <ul style="list-style-type: none"> <li>-metal</li> <li>-soft, silver</li> <li>-shiny</li> <li>-low density</li> <li>-conductor</li> <li>-reacts violently in water</li> </ul> <p>133</p>	<p>Mystery Element</p> 	<p>Krypton</p> <p><b>Kr</b></p> <ul style="list-style-type: none"> <li>-nonmetal</li> <li>-gas</li> <li>-very stable</li> </ul> <p>84</p>