

# The Periodic Table

## So Many Elements!

Everything in the world is made of atoms, and there are over 100 different kinds of atoms. When something is made entirely of one kind of atom, it is called an element. Silver is an element, made of silver atoms. Helium is another element, made of helium atoms.

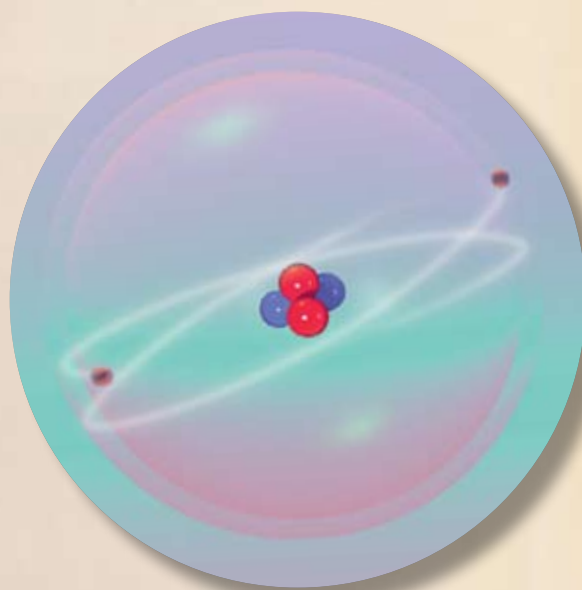
Different elements have different properties (**PROP-er-tees**). A property is something that an element does or how it acts in certain circumstances.

For instance, silver atoms share their electrons in a special way. This makes them easy to pack together. Clumps of silver atoms are hard and keep their shape because they pack together in this way. A few other elements also share electrons in this special way. Together, these elements are called metals.

Helium atoms have so many electrons that they can't take any more. That means that they do not react with other atoms. A few other atoms are also full up on electrons. They do not react with other atoms, either. This group of elements is called the noble gases.

There are many different groups of elements. There are some elements that react in one way, and other elements that react in another way. There are some elements that fall apart over time called radioactive elements. There are some elements that steal electrons from other elements.

Elements are members of more than one group at a time. Uranium, for instance, is a metal and is also radioactive. It is in the metal group and in the radioactive group. This can be very confusing. It's like there is just a big pile of elements. Scientists didn't know how to organize all of these elements until Dmitri Mendeleév (duh-ME-tree MEN-duh-LAY-yef).



**Helium atom**

## Periodic Table

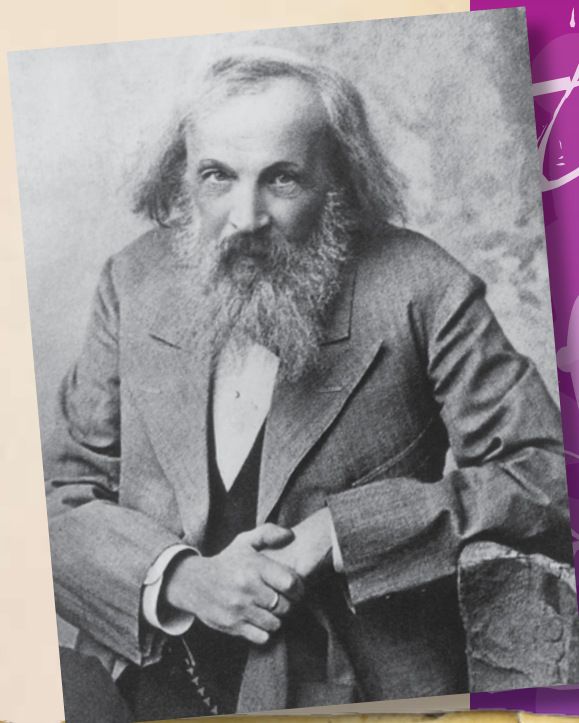
Dmitri Mendeleev was a chemist from Siberia. He was the youngest of 14 children. When his father died, his mother put all of her energy into getting her young son a good education. He loved science, so she helped him follow that dream.

Mendeleev studied chemistry. He learned about the elements, but he thought they should be organized. In 1869, he decided to organize all the known elements into a chart. This chart is called the Periodic Table of Elements. It remains a basic tool used by scientists today.

In the table, elements are arranged left to right and top to bottom. They are arranged by their atomic number. The atomic number is the number of protons in an element's atom. The elements are written in the form of their chemical symbols. The symbols are short forms of the names of the elements.

The rows of elements are called periods. Each column of the table is called a group or family. Elements in these periods and groups share properties.

When Mendeleev created the table, there were 63 known elements. He believed there were more. He also thought the unknown elements could be predicted. He found gaps in his table. He believed that elements would be found to fill those gaps. He left space for them on purpose. During his life, three of the elements he predicted were discovered. Mendeleev made sense of the pile of elements!



**ПЕРИОДИЧЕСКАЯ СИСТЕМА ЭЛЕМЕНТОВ**

Период	Группы	ГРУППЫ ЭЛЕМЕНТОВ									
		I	II	III	IV	V	VI	VII	VIII	0	
1	I	H <sup>1</sup> 1,008									He <sup>2</sup> 4,003
2	II	Li <sup>3</sup> 6,940	Be <sup>4</sup> 9,02	B <sup>5</sup> 10,82	C <sup>6</sup> 12,010	N <sup>7</sup> 14,008	O <sup>8</sup> 16,000	F <sup>9</sup> 19,00			Ne <sup>10</sup> 20,183
3	III	Na <sup>11</sup> 22,997	Mg <sup>12</sup> 24,32	Al <sup>13</sup> 26,97	Si <sup>14</sup> 28,06	P <sup>15</sup> 30,98	S <sup>16</sup> 32,06	Cl <sup>17</sup> 35,457			Ar <sup>18</sup> 39,944
4	IV	K <sup>19</sup> 39,096	Ca <sup>20</sup> 40,08	Sc <sup>21</sup> 45,90	Ti <sup>22</sup> 47,90	V <sup>23</sup> 50,95	Cr <sup>24</sup> 52,01	Mn <sup>25</sup> 54,93	Fe <sup>26</sup> 55,85	Co <sup>27</sup> 58,94	Ni <sup>28</sup> 58,69
	V	Cu <sup>29</sup> 63,57	Zn <sup>30</sup> 65,39	Ga <sup>31</sup> 69,72	Ge <sup>32</sup> 72,60	As <sup>33</sup> 74,91	Se <sup>34</sup> 78,96	Br <sup>35</sup> 79,916			Kr <sup>36</sup> 83,7
5	VI	Rb <sup>37</sup> 85,48	Sr <sup>38</sup> 87,63	Y <sup>39</sup> 88,92	Zr <sup>40</sup> 91,22	Nb <sup>41</sup> 92,91	Mo <sup>42</sup> 95,95	Ma <sup>43</sup> —	Ru <sup>44</sup> 101,7	Rh <sup>45</sup> 102,91	Pd <sup>46</sup> 106,7
	VII	Ag <sup>47</sup> 107,88	Cd <sup>48</sup> 112,41	In <sup>49</sup> 114,76	Sn <sup>50</sup> 118,70	Sb <sup>51</sup> 121,76	Te <sup>52</sup> 127,61	J <sup>53</sup> 126,92			Xe <sup>54</sup> 131,3
6	VIII	Cs <sup>55</sup> 132,91	Ba <sup>56</sup> 137,36	La <sup>57</sup> 138,92	Hf <sup>72</sup> 178,6	Ta <sup>73</sup> 180,88	W <sup>74</sup> 183,92	Re <sup>75</sup> 186,31	Os <sup>76</sup> 190,2	Ir <sup>77</sup> 193,1	Pt <sup>78</sup> 195,23
	IX	Au <sup>79</sup> 197,2	Hg <sup>80</sup> 200,61	Tl <sup>81</sup> 204,39	Pb <sup>82</sup> 207,21	Bi <sup>83</sup> 208,00	Po <sup>84</sup> 210	At <sup>85</sup> —			Rn <sup>86</sup> 222
7	X	Ra <sup>88</sup> 226,05	Ac <sup>89</sup> 227	Th <sup>90</sup> 232,12	Pa <sup>91</sup> 231	U <sup>92</sup> 238,07					

\* ЛАНТАНЫ ДЫ 58-71

Ce <sup>58</sup> 140,13	Pr <sup>59</sup> 140,92	Nd <sup>60</sup> 144,27	Sm <sup>62</sup> 150,43	Eu <sup>63</sup> 152,0	Gd <sup>64</sup> 158,9	
Th <sup>65</sup> 232,04	Dy <sup>66</sup> 162,5	Ho <sup>67</sup> 164,93	Er <sup>68</sup> 167,26	Tu <sup>69</sup> 168,93	Yb <sup>70</sup> 173,05	Cp <sup>71</sup> 174,99

## Comprehension Question

How is the organization of the periodic table useful for studying the properties of different elements?