

The Periodic Table

By Sharon Fabian

¹ People have always tried to organize things. Organizing things helps us to understand them and to see how different things are related. Maybe you have noticed your little brother or sister grouping toys or blocks by their color or size. Ancient people had their own ways of organizing things. The ancient Greeks suggested that everything in the world could be organized into four groups -- earth, wind, fire, and water. Today, scientists generally organize the world into two main groups, matter and energy. These main groups are then organized some more into smaller groups.

					18
					2
					He
					4.00
13	14	15	16	17	
2.0 5	2.5 6	3.0 7	3.5 8	4.0 9	10
B	C	N	O	F	Ne
10.81	12.01	14.01	16.00	18.998	20.179

² Today we use the **periodic table** to organize matter. It is a chart that shows all of the basic elements that make up our world organized into rows, called **periods**, and columns, called **groups**.

³ It took a long time before we came up with this arrangement, though! Scientists tried a lot of arrangements before they came up with one that worked. Dr. Timmothy Stowe created a chart of the elements that was made up of zigzag rows. Professor Theodore Benfey's chart looked like a circle with three big handles. Emil Zmaczynski drew a triangular chart.

⁴ In 1869, Dmitri Mendeleev created a periodic table much like the one that we use today. He arranged the elements in groups and periods to show the relationships between the elements. One amazing thing about his periodic table was that it left blank spaces for elements that would not be discovered until much later! That is why the periodic table that we use today, over 130 years later, is still so much like Mendeleev's original one.

⁵ The periodic table is made up of squares, with each square representing one element. There is a square for copper, a square for oxygen, a square for neon, and so on. To help understand the periodic table, let's look at just one square. Take a piece of scrap paper and draw a square. In the center of the square, write "He." At the top write the number 2. At the bottom, write the number 4.003. The letters in the middle are the symbol for the element. Usually, it looks like an abbreviation for the element's name, but not always. These symbols are international; they are used all over the world. "He" stands for helium. The number at the top is the element's atomic number. It tells the number of protons that that element has. This is also the number of electrons, since atoms have the same number of protons and electrons. Helium has two protons and two electrons. The number at the bottom is the mass number. It is usually written as a decimal number, because it is the average of the mass numbers of different forms of the element. The mass number tells how heavy an atom is, and it is the total of its protons and neutrons. Helium has a mass number of about four, so we know that it has two neutrons and two protons.

⁶ The periodic table is just one of the tools that scientists use to make discoveries about the elements. One interesting thing about helium is that it was discovered in a solar eclipse. You probably know that helium is used in balloons, but did you know that it is also used in pressurized rocket fuel, and to cool nuclear reactors?

⁷ If you know how the periodic table is arranged, you can tell a lot about an element just by where it is located on the table. For instance, the elements on the left side are metals. The elements on the right side are nonmetals.

⁸ Elements are arranged in order by their atomic numbers, so the elements at the top of the table are usually the light weight ones. Hydrogen, at number one, is lighter than air. Radon, at atomic number 86, is a heavy gas. There are safety concerns about radon gas, and since it is heavy, people know to search for it in the basement of homes, not in the attic.

⁹ There is a lot more that the periodic table can tell us. To start learning about the elements, you might want to make some flash cards to learn the name and symbol for each element. You can play a game of concentration with the flash cards. Then take some time to study the periodic table itself. You should be able to find web sites with some good information about it. See what connections you can discover between the different elements.

The Periodic Table

<p>1. The periodic table is</p> <p><input type="radio"/> A An element</p> <p><input type="radio"/> B A book</p> <p><input type="radio"/> C A chart</p> <p><input type="radio"/> D A piece of furniture</p>	<p>2. Today's periodic table was invented by</p> <p><input type="radio"/> A Bill Nye</p> <p><input type="radio"/> B Dr. Stowe</p> <p><input type="radio"/> C Dmitri Mendeleev</p> <p><input type="radio"/> D Ancient Greeks</p>
<p>3. Which of the following describes the modern periodic table?</p> <p><input type="radio"/> A A chart made of rows and columns</p> <p><input type="radio"/> B A square</p> <p><input type="radio"/> C A chart made of zigzag lines</p> <p><input type="radio"/> D A triangle</p>	<p>4. Radon and helium are nonmetals. They would be on the _____ of the periodic table.</p> <p><input type="radio"/> A Top</p> <p><input type="radio"/> B Right side</p> <p><input type="radio"/> C Bottom</p> <p><input type="radio"/> D Left side</p>
<p>5. Iron and copper would be on the _____ of the periodic table.</p> <p><input type="radio"/> A Bottom</p> <p><input type="radio"/> B Left side</p> <p><input type="radio"/> C Top</p> <p><input type="radio"/> D Right side</p>	<p>6. Today's periodic table is much like the one Mendeleev drew in 1869. It has not changed much because</p> <p><input type="radio"/> A Mendeleev made a lucky guess</p> <p><input type="radio"/> B No new elements have been discovered</p> <p><input type="radio"/> C Mendeleev left spaces for the elements that had not been discovered yet</p> <p><input type="radio"/> D All of the new elements are just added on at the end of the table</p>
<p>7. Look at the periodic table in your HAB...it's in the back. Name the element that has an atomic number of 99. (Gee...I wonder where they got that name!?)</p> <p>_____</p> <p>_____</p>	<p>8. Look at a periodic table in your HAB. Name the element that has an atomic number of 47.</p> <p>_____</p> <p>_____</p>

