



Be a Scientist!

Design a new periodic table using fifteen to twenty elements. Consider their properties—atomic weight, atomic number, and type (metal, metalloid, nonmetal, or gas). How are the elements the same, and how are they different?

Now devise your own way to organize your group of elements. It does not have to resemble Dmitri Mendeleev's table. Use any shape or design that you think will clearly display the information. Then be prepared to share it with the class, including an explanation of why you organized the data the way you did.



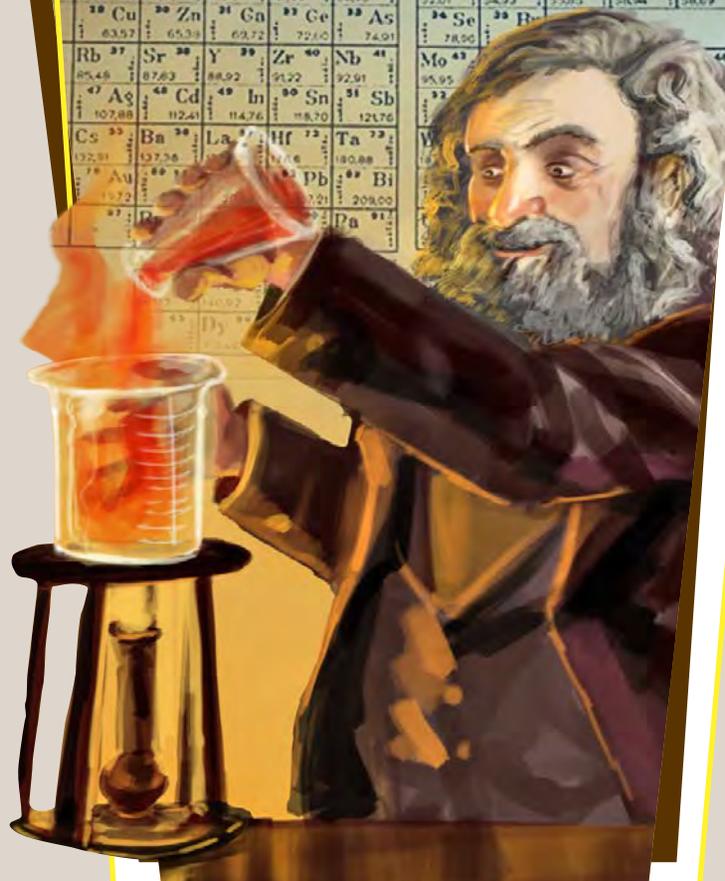
Beyond the Book

Using a periodic table, choose an element and write what you know about it. Then conduct research on the Internet or at the library to learn more about your element.

FOCUS Book

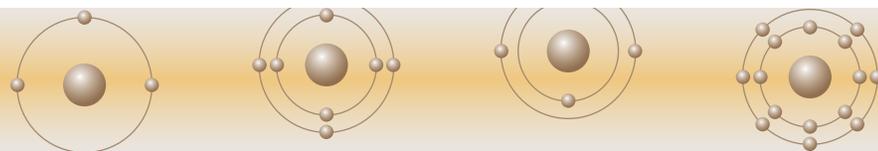
Dmitri's Table

ПЕРИОДИЧЕСКАЯ СИСТЕМА ЭЛЕМЕНТОВ									
ГРУППЫ ЭЛЕМЕНТОВ									
	I	II	III	IV	V	VI	VII	VIII	
1	H 1 1.008								
2	Li 3 6.940	Be 4 9.012	B 5 10.81	C 6 12.01	N 7 14.008	O 8 16.000	F 9 18.998		
3	Na 11 22.997	Mg 12 24.32	Al 13 26.97	Si 14 28.08	P 15 30.98	S 16 32.06	Cl 17 35.45		
4	K 19 39.098	Ca 20 40.08	Sc 21 45.0	Ti 22 47.88	V 23 50.94	Cr 24 52.00	Mn 25 54.94	Fe 26 55.85	Co 27 58.93
5	Rb 37 85.47	Sr 38 87.62	Y 39 88.91	Zr 40 91.22	Nb 41 92.91	Mo 42 95.94	Tc 43 98.91	Ru 44 101.07	Rh 45 102.91
6	Cs 55 132.91	Ba 56 137.33	La 57 138.91	Hf 72 178.49	Ta 73 180.95	W 74 183.85	Re 75 186.21	Os 76 190.23	Pt 78 195.08



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Notes



Dmitri's Table



FOCUS Question

How does the periodic table help us understand what makes up matter?

Patterns

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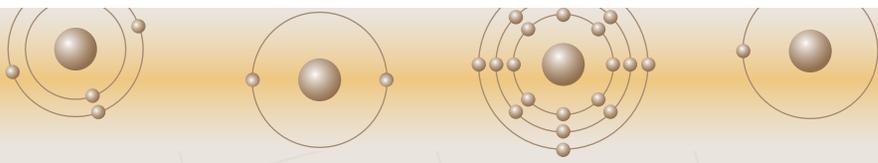
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Written by Karen de Seve

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Organizing the Elements

Are you sitting in a chair? You are probably wearing shoes. Maybe you just had lunch. That chair, your shoes, and your food are types of *matter*. In fact, everything that takes up space and has mass—even air—is made of matter.

All matter is made of tiny components called *elements*—substances that can't be broken down into smaller substances. There are about 120 known elements on Earth, and researchers continue to discover new ones. To organize and keep track of them all, scientists rely on a grid called the Periodic Table of the Elements.



Notes

Read-Think-Write

Write your answers on separate paper. Use details from the text as evidence.

- 1 What conclusion can you draw from page 3 about why Mendeleev created the Periodic Table of the Elements?
- 2 How does the heading on page 6, Setting the Table, reveal the main idea of this page?
- 3 Using the tables and text on pages 4 and 8, compare Mendeleev's table with today's periodic table. How are they similar and different?
- 4 What does *period* mean as the author uses it on page 7?
- 5 Suppose you found a new element. Based on what you read, what steps would you have to take to get it added to the periodic table?

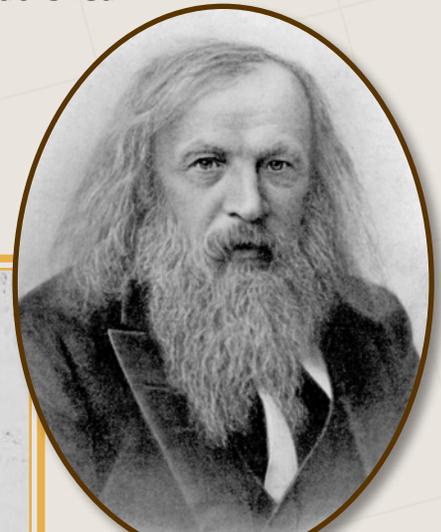
FOCUS Question

How does the periodic table help us understand what makes up matter? Explain what types of information can be found about the element zinc using information from a periodic table.



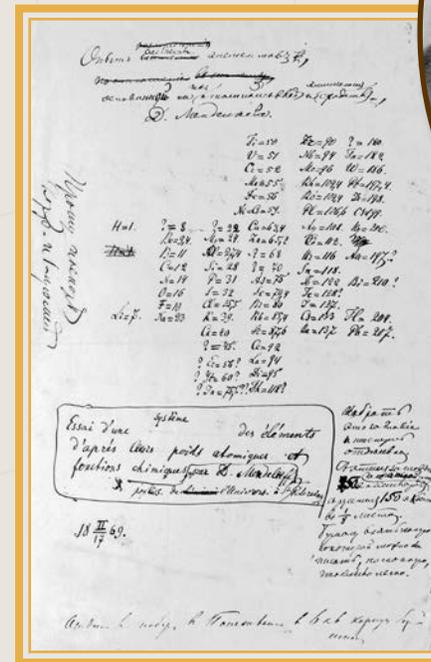
By the mid-1800s, scientists had identified sixty elements. Researchers working in different parts of the world needed a way to discuss these elements and classify them by how they behave. These groupings would eventually be shared among all scientists.

A few scientists devised their own charts, or *periodic tables*, to organize this important data. A Russian chemist named Dmitri Mendeleev published his periodic table in 1869. His table became the most popular one, and a version of it is still in use today.



Dmitri Mendeleev

Dmitri Mendeleev wrote out this early version of his periodic table by hand.



Dmitri's Details

Figuring out how to group sixty elements was not easy, but Mendeleev invented a way to describe each of the elements and organize them in a meaningful way. Dmitri's periodic table contained two details for each element—*chemical symbol* and *atomic weight*.

chemical symbol **H = 1** atomic weight

ОПЫТЪ СИСТЕМЫ ЭЛЕМЕНТОВЪ.
ОСНОВАННОЙ НА ВѢСѢ АТОМОВЪ ВѢСѢ И ХИМИЧЕСКОМЪ СХОДСТВѢ.

Li = 7	Na = 23	K = 39	Rb = 85,4	Cs = 133	Tl = 204.
F = 19	Cl = 35,5	Br = 80	I = 127		
O = 16	S = 32	Se = 79,4	Te = 128?		
N = 14	P = 31	As = 75	Sb = 122	Bi = 210?	
C = 12	Si = 28	? = 70	Sn = 118		
B = 11	Al = 27,1	? = 68	Ur = 116	Au = 197?	
Be = 9,4	Mg = 24	Zn = 65,4	Cd = 112		
		Cu = 63,4	Ag = 108	Hg = 200.	
		Ni = 59	Pt = 106,4	O = 16.	
		Fe = 56	Rh = 104,4	Ir = 196.	
		Mn = 55			
		Cr = 52	Mo = 96	W = 186.	
		V = 51	Nb = 94	Ta = 182.	
		Ti = 50	Zr = 90	? = 180.	

Д. Менделѣевъ

Mendeleev's table was first published in 1869.

A chemical symbol represents the element's name with one or two letters. This symbol often comes from the Latin word for the element. For example, hydrogen is H and gold is Au.

Mendeleev then listed the elements by increasing atomic weight. At the time, scientists didn't know exactly how much atoms weighed, but they were able to estimate on the basis of results from chemical reactions. We now know that the tiny atoms of each element are made up of even smaller particles.

Word Wise

The Latin word for gold is *aurum*, so the chemical symbol is Au.



Periodic Updates

Sometimes researchers stumble on new elements while studying something else. Marie Curie discovered polonium and radium while she was studying uranium.

Before a new element can be added to the periodic table, researchers must prove it exists. The International Union of Pure and Applied Chemistry first reviews the evidence. Then it decides if the element gets officially added to the periodic table. Element 117, ununseptium, was added to the table four years after researchers first detected it.

Who knows, maybe you will find a new element one day!



Wowser!

Ununseptium is known as a superheavy element. With an atomic weight of 294, it is 40 percent heavier than an atom of lead.

