Section 5.1 Organizing the Elements
(pages 126–129)

This section explains how Mendeleev organized elements into a periodic table. It also discusses the predictions he made about undiscovered elements and how the discovery of those elements supported his version of the table of the table.

Reading Strategy (page 126)

Identifying Main Ideas As you read, complete the table by identifying the main idea for each topic. For more information on this reading strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Topic	Main Idea
Mendeleev's proposal	
Mendeleev's prediction	
Evidence supporting Mendeleev's table	

The Search for Order (page 126)

1. Is the following sentence true or false? The first elements to be identified were mainly gases. ______________
2. As the number of known elements grew, so did the need to organize them into groups based on their ______________.
3. Circle the letter of each category that the French chemist Antoine Lavoisier used to classify elements.
   a. gases
   b. metals
   c. liquids
   d. nonmetals

Mendeleev's Periodic Table (pages 127–129)

4. Is the following sentence true or false? Mendeleev needed to organize information about 63 elements. ______________
5. Mendeleev's strategy for classifying elements was modeled on a(n) ______________.
6. Circle the letter of each type of information Mendeleev knew about each element.
   a. name
   b. number of protons
   c. relative mass
   d. properties

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Chapter 5 The Periodic Table

7. Mendeleev arranged the elements into rows in order of ________________ so that elements with similar properties were in the same column.

8. Is the following sentence true or false? A periodic table is an arrangement of elements in columns, based on a set of properties that repeat from row to row. ________________

Group I	Group II	Group III	Group IV	Group V	Group VI	Group VII	Group VIII
H = 1 Li = 7	Be = 9.4	B = 11	C = 12	N = 14	O = 16	F = 19	
Na = 23 K = 39	Mg = 24 Ca = 40	Al = 27.3 — = 44	Si = 28 Ti = 48	P = 31 V = 51	S = 32 Cr = 52	Cl = 35.5 Mn = 55	Fe = 56, Co = 59, Ni = 59, Cu = 63.
(Cu = 63) Rb = 85	Zn = 65 Sr = 87	— = 68 Yt = 88	— = 72 Zr = 90	As = 75 Nb = 94	Se = 78 Mo = 96	Br = 80 — = 100	Ru = 104, Rh = 104, Pd = 106, Ag = 108.
(Ag = 108) Cs = 133	Cd = 112 Ba = 137	In = 113 Di = 138	Sn = 118 Ce = 140	Sb = 122 —	Te = 125 —	I = 127 —	— — — —
(—) —	— —	— Er = 178	— La = 180	— Ta = 182	— W = 184	— —	Os = 195, Ir = 197, Pt = 198, Au = 199.
(Au = 199) —	Hg = 200 —	Tl = 204 —	Pb = 207 Th = 231	Bi = 208 —	U = 240		

9. Mendeleev published the table above in 1872. Why did Mendeleev leave some locations in his periodic table blank? ________________________________

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10. Circle the letters of two elements that have similar properties.

a. zinc (Zn) b. chlorine (Cl)

c. nitrogen (N) d. bromine (Br)

11. How did Mendeleev decide where to place arsenic (As) and selenium (Se)?

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12. Is the following sentence true or false? Mendeleev was the first scientist to arrange elements in a periodic table. ____________

13. Describe a test for the correctness of a scientific model. ________________

____

14. Mendeleev used the ________________ located near the spaces in his table to predict properties for undiscovered elements.

15. The close match between Mendeleev's predictions and the actual properties of new elements showed ________________________.

16. Circle the letter of each element that was discovered after Mendeleev published his periodic table that supported Mendeleev's predictions and provided evidence validating the table.

a. gallium b. scandium

c. germanium d. aluminum