LESSON 76

CLASSWORK

Billions and Billions
Avogadro's Number

Name _____

Date _____ Period _____

Purpose

To find the relationship between mass and number of atoms.

Analysis

1. The table on the next page shows the mass of different numbers of atoms of zinc, aluminum, and iron. Complete the table.
2. What is scientific notation?

3. Why do you think scientists use scientific notation?

4. What are two ways of writing the smallest number in the table? What does it represent?

5. What are two ways of writing the largest number in the table? What does it represent?

6. Which has the most mass, 1 trillion atoms of zinc, 100 trillion atoms of iron, or 500 trillion atoms of aluminum? Explain how you can tell.

7. How many zinc atoms are there in 65.4 g?

8. Some of the numbers in scientific notation have a negative exponent, and some have a positive exponent. Explain the difference between these two types of numbers.

9. What do 65.4 g of zinc, 27.0 g of aluminum, and 55.8 g of iron have in common?

10. What name do chemists give to a collection of 602 sextillion objects?

Substance	Amount	Number of atoms	Number of atoms in scientific notation	Mass (g)	Mass in scientific notation
zinc Zn(*s*)	1 hundred	100	1.0×10^{2}	0.00000000000000000011 g	1.1×10^{-20} g
	1 hundred thousand	100,000	1.0×10^{5}	0.000000000000000011 g	1.1×10^{-17} g
	1 trillion	1,000,000,000,000			1.1×10^{-10} g
	602 sextillion	602,000,000,000,000,000,000,000		65.4 g	6.54×10^{1} g
aluminum Al(*s*)	1 million	1,000,000		0.000000000000000045 g	4.5×10^{-17} g
	500 trillion	500,000,000,000,000		0.000000022 g	
	1 quintillion	1,000,000,000,000,000,000	1.0×10^{18}		4.5×10^{-6} g
	602 sextillion		6.02×10^{23}	27.0 g	2.70×10^{1} g
iron Fe(*s*)	1 billion	1,000,000,000		0.000000000000093 g	
	100 trillion	100,000,000,000,000		0.0000000093 g	9.3×10^{-9} g
	602 sextillion				5.58×10^{1} g
	1,204 sextillion			111.6 g	