Name: _____ Period: _____ Date: _____

Math Spotlight – Scientific Notation

The mass of a hydrogen atom is 0.00000000000000000000000014 g. The number of atoms in 1 mole is 620,000,000,000,000,000,000,000. To make these numbers easier to read, compare, and use in calculations, scientists use scientific notation. The long numbers above can be written as 1.4×10^{-24} and 6.02×10^{23}.

Each number is written as a decimal with one digit to the left of the decimal point times a power of 10. A number written in scientific notation has the form:

$$a \times 10^{n}$$

- $1 \leq a < 10$
- n = the number of places you move the decimal
    - If n is (+), move the decimal to the right to make a large number
    - If n is (-), move the decimal to the left to make a small number

Example:

1.56×10^{4}

2.789×10^{-6}

Example:

0.000068

20,500,000

Practice

1. 3,400 _____
2. 0.000023 _____
3. 101,000 _____
4. 0.010 _____
5. 45.01 _____
6. 1,000,000 _____
7. 0.00671 _____
8. 4.50 _____
9. 2.30×10^{8} _____
10. 1.76×10^{-3} _____
11. 1.901×10^{-7} _____
12. 8.65×10^{-1} _____
13. 9.11×10^{3} _____
14. 5.40×10^{1} _____
15. 1.76×10^{0} _____
16. 7.4×10^{-5} _____

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}	0.00000000000000011 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		0.00000000000000045 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	