Unit 1 – Lesson 9 – Part 1		Name:	
Scientific Notation		Date:	Period:
Focus Standard:	8.EE.A.3	Use numbers expressed in the form 10 to estimate very large or very sr times as much one is than the othe <i>the United States as 3 x 10⁸ and the</i> <i>determine that the world populatio</i>	n of a single digit times an integer power of nall quantities, and to express how many r. For example, estimate the population of e population of the world as 7 x 10 ⁹ , and n is more than 20 times larger.
	8.EE.A.4	Perform operations with numbers of problems where both decimal and notation and choose units of appro or very small quantities (e.g., use m Interpret scientific notation that ha	expressed in scientific notation, including scientific notation are used. Use scientific priate size for measurements of very large sillimeters per year for seafloor spreading). s been generated by technology.

Student Outcomes

 Students write, add, and subtract numbers in scientific notation and understand what is meant by the term leading digit.

A positive, finite decimal s is said to be written in scientific notation if it is expressed as a product $d \times 10^n$, where d is a finite decimal so that $1 \le d < 10$, and n is an integer.

The integer *n* is called the **order of magnitude** of the decimal $d \times 10^n$.

Convert the following values into scientific notation:

1. -235.532

2. 0.0004326

Convert the following values into standard form:

- 3. 5.893 x 10⁻⁵
- 4. -7.8927 x 10⁵

Example 1: The finite decimal 234.567 is equal to every one of the following:

Only one of these is written in scientific notation. Identify the proper format and explain why it is correct.

$2.345~67 \times 10^2$	0.234567×10^3	23.4567 × 10
234.567 × 10°	234 567 × 10 ⁻³	234 567 000 × 10 ⁻⁶

Identify if the following numbers are written in scientific notation. If not, explain why?

Exercise 1	Exercise 4
1.908×10^{17}	$4.0701 + 10^7$

Exercise 2	Exercise 5
0.325×10^{-2}	18.432×5^{8}

Exercise 3	Exercise 6
7.99×10^{32}	8×10^{-11}

Example 2: Let's say we need to determine the difference in the populations of Texas and North Dakota. In 2012, Texas had a population of about 26 million people, and North Dakota had a population of about 6.9×10^4 . Before comparing the values, let's write both in scientific notation.

Example 3: Let's say that we need to find the combined mass of two hydrogen atoms and one oxygen atom, which is normally written as H_2O or otherwise known as water. To appreciate the value of scientific notation, the mass of each atom will be given in standard notation:

- One hydrogen atom is approximately 0.000 000 000 000 000 000 000 001 7 kilograms.
- One oxygen atom is approximately 0.000 000 000 000 000 000 000 027 kilograms.

Convert both hydrogen and oxygen into scientific notation.

Exercises:

1. Earth's circumference at the equator is 24,901.55 miles.

Write this number written in scientific notation.

Standard Form	Product Form	Scientific Notation
24,901.55		
2. The thickness of the Write this number wr	human retina is 0.00012 meters. itten in scientific notation.	
Standard Form	Product Form	Scientific Notation

0.00012

Problem Set

1. Write the number **68,127,000,000,000** in scientific notation. Which of the two representations of this number do you prefer? Explain.

2. Earth's diameter at the equator is 7.92628×10^3 miles.

Write this number in standard form.

Scientific Notation	Product Form	Standard Form
7.92628 x 10 ³		
3. Time for light to tra Write this number	avel 1 meter is 3.34 x 10 ⁻¹⁰ seconds. in standard form.	
Scientific Notation	Product Form	Standard Form

3.34 x 10⁻¹⁰

Write the number in scientific notation.

	Product Form	Scientific Notation
4. –9,180,000		
5. 0.0000062		
6. 100		
Write the number in s	standard form.	
	Product Form	Standard Form
7. 2.78 x 10 ⁷		
8. −5.67 x 10 ⁻³		
9. 1 x 10 ⁻⁵		