Lesson 7:

Scientific Notation

SNC1P

Scientific notation (also called Standard Form in Britain) is the way that scientists easily handle very large numbers or very small numbers.

Like this: $700 \rightarrow 7 \times 10^2$

700 — A Number; 7×10^2 — In Scientific Notation

Or this: $4{,}900{,}000{,}000 \rightarrow 4.9 \times 10^9$

4,900,000,000 — A Number; 4.9×10^9 — In Scientific Notation

For example,

700 → is written as 7×10^2 in scientific notation. Why? How? $700 = 7 \times 100$ and $100 = 10^2$ *(see powers of 10)* so $700 = 7 \times 10^2$ Both 700 and 7×10^2 have the same value but just shown in different ways.	**What about this: 4,900,000,000?** $4{,}900{,}000{,}000 = 4.9 \times 1{,}000{,}000{,}000$ but $1{,}000{,}000{,}000 = 10^9$, so 4,900,000,000 is **$4.9 \times 10^9$** in scientific notation.

The number is written in **two parts**:

- Just the **digits** (with the decimal point placed after the first digit), followed by
- **× 10 to a power** that puts the decimal point where it should be
  (i.e. it shows how many places to move the decimal point).

Digits — Power of 10

$5326.6 = 5.3266 \times 10^3$

5326.6 — A Number; 5.3266×10^3 — In Scientific Notation

In this example, 5326.6 is written as **5.3266×10^3**, because $5326.6 = 5.3266 \times 1000 = 5.3266 \times 10^3$

Sample Problems/Homework

A.	*Convert the following numbers into scientific notation*	
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)	7000000	
10)	6050000000	
11)	940000000	
12)	5000000000	
13)	1230000000000000	
14)	48900000000	
15)	8700000000	
16)	0.452	
17)	0.0012	
18)	0.00004	
19)	0.009205	
20)	0.5781	

B.	*Convert the following numbers into standard notation:*	
1)	2.30×10^{4}	
2)	1.76×10^{-3}	
3)	1.901×10^{-7}	
4)	8.65×10^{-1}	
5)	9.11×10^{3}	
6)	5.40×10^{1}	
7)	1.76×10^{0}	
8)	7.4×10^{-5}	
9)	2.34×10^{5}	
10)	3.10×10^{4}	
11)	7.23×10^{-4}	
12)	2.4785×10^{2}	
13)	1.92×10^{7}	
14)	2.68×10^{3}	
15)	5.16×10^{-5}	
16)	5.92×10^{-5}	
17)	7.12×10^{6}	
18)	9.11×10^{5}	
19)	3.8×10^{-4}	
20)	8.291×10^{-5}	