

Scientific Notation

- a way to represent large and small numbers
- a way to indicate significant figures

$$a.a\text{a} \dots \times 10^a$$

$$3.6 \times 10^4$$

means

$$3.6 \times 10 \times 10 \times 10 \times 10$$

OR

$$36000$$

$$6.21 \times 10^{-3}$$

means

$$6.21 \times \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10}$$

OR

$$0.00621$$

Scientific notation removes the need for placeholder zeros, and that's good when you're dealing with very large and very small numbers!

$$4.70 \times 10^{-6} = 0,00000470$$

Scientific notation indicates significant figures without extra decimal points or lines. All numbers in front of the power of ten are significant!

$$\underbrace{3700}_{\text{}} = 3,70 \times 10^3$$

To write a number in scientific notation, move the decimal point so that it is behind the first nonzero number. The power of ten will be the number of places you moved the decimal. If the number is less than 1, the power of ten is negative. If it's greater than one, the power of ten is positive.

$$\begin{array}{c} 0,00765 \\ \underbrace{\hspace{1.5cm}}_3 \\ 7,65 \times 10^{-3} \end{array}$$

$$\begin{array}{c} 14,000 \\ \underbrace{\hspace{1.5cm}}_4 \\ 1,400 \times 10^4 \end{array}$$

$$6.38 \times 10^5$$

$$6.3800000000$$

$$638000$$

$$4.20 \times 10^{-6}$$

$$0000004.20$$

$$0.00000420$$

$$6.38 \times 10^5$$

TI-83

$$6.38 \boxed{EE} \boxed{5}$$

$$6.38E5$$

$$10^3 \dots \boxed{EE} \boxed{3}$$

$$4.20 \times 10^{-6}$$

$$4.20 \boxed{EE} \boxed{(-)} \boxed{6}$$

$$4.2E^{-6}$$

Matter

- anything that takes up space and can be perceived!

What about the structure of matter? Matter as atoms!

Phases

Solids

rigid - fixed shape

dense

fixed volume

liquids

variable shape
flow, /

dense

fixed volume

gases

variable shape
flow, /

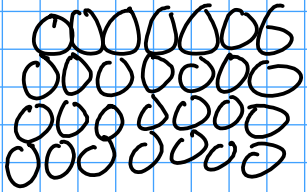
not dense

variable volume

An atomic picture of the phases of matter

Solids:

- fixed shape, dense, fixed volume



- Atoms closely packed
- Atoms are arranged in a regular structure (a CRYSTAL), giving the solid rigidity
- Atoms are strongly attracted to each other, keeping the solid together
- Atoms do not move about freely, but there is some vibration