

PROPERTIES OF MATTER

WHAT IS MATTER?

OMatter is anything that has mass and takes up space (volume).

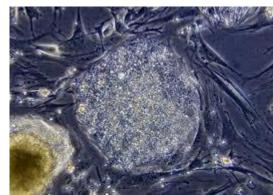
OExamples of matter:







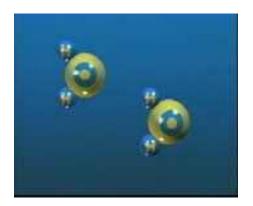


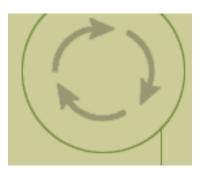


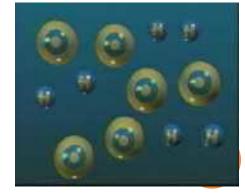


LAW OF CONSERVATION OF MATTER

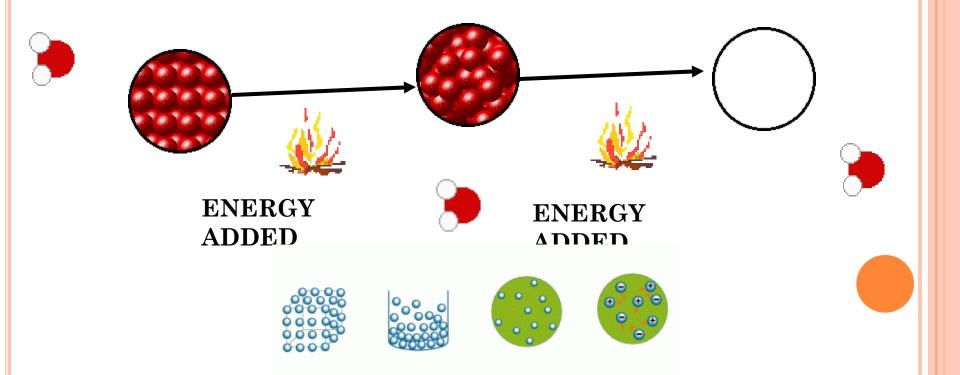
• MATTER CANNOT BE CREATED OR DESTROYED IT JUST CHANGES FROM ONE FORM TO ANOTHER. (MATTER GETS RECYCLED)







THEORY OF KINETIC ENERGY 1. ATOMS ARE ALWAYS MOVING 2. THE MORE ENERGY ADDED TO THE ATOMS, THE FASTER & FARTHER APART THEY MOVE



MATTER

- Matter can be described by using <u>physical</u> <u>and chemical properties</u>.
 - These are characteristics of matter that make it unique.
- Physical Properties are properties that can be observed or measured.
 - color, mass, length, volume, density, state, etc.
- Physical Properties can be either:
 Observable or Measurable

OBSERVABLE PHYSICAL PROPERTIES

• Properties in which you use your five senses to get information about an object.

• If you can describe the matter based on what it looks, feels, smells or tastes like, you are describing the physical properties.





• <u>Malleability</u> - the ability of a substance to be pounded into thin sheets.



• <u>Color</u>: The color of object can be seen and is a physical property of matter.

• Color can help identify a substance. For example, sulfur is usually yellow in color, iodine is usually red in color.





Sulfur

Iodine

- <u>Odor</u>: The smell or odor an object gives off can also help identify a substance.
- For example, sulfur has a rotten egg smell, vinegar has a very acidic smell, and chlorine has a very strong bleach smell.



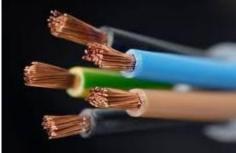






- <u>Conductor</u> of heat or electricity: The ability for heat and electricity to pass through an object easily.
- **Metals** are usually the best conductors of heat and electricity.







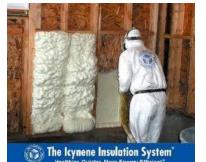


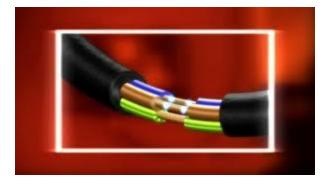


- <u>Insulator</u> of heat or electricity: when an object passes heat and electricity poorly.
- Nonmetals are usually good insulators.



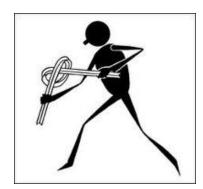








- <u>Ductility</u> the ability to be drawn or pulled into a wire.
- Metals are usually ductile.







- <u>Solubility</u> The ability to dissolve in another substance.
- Examples: sugar dissolves in water.





• <u>State of Matter</u>: Matter can either be a solid, liquid, gas, or plasma. We observe this by using our senses.

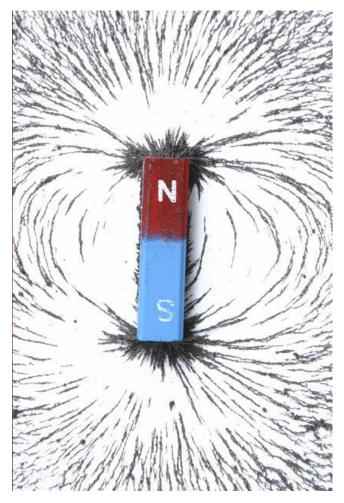


 explore the influence of physical properties of matter on everyday life



MAGNETISM

• <u>Magnetism</u> – attraction to a magnet





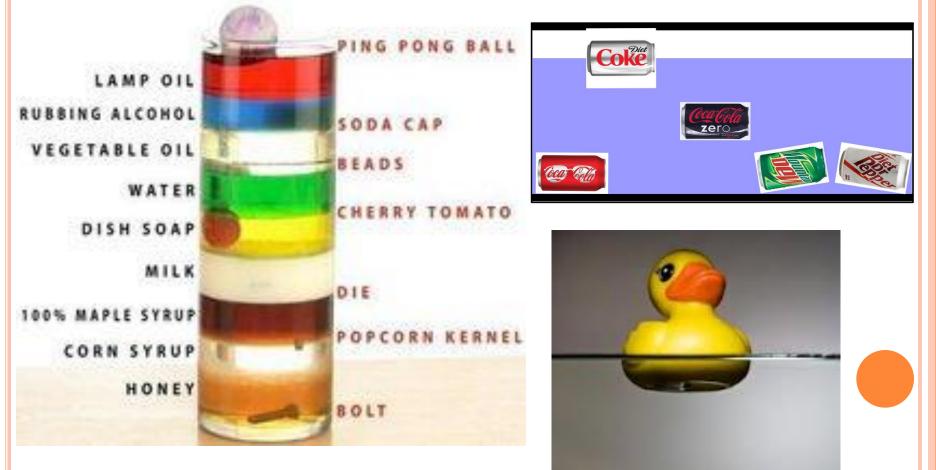
TEXTURE

• <u>Texture</u> – the visual and tactile quality of a surface.

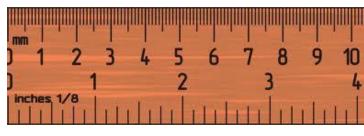
Rough Smooth

RELATIVE DENSITY

• <u>Relative Density</u> – the density of an object compared to its surrounding material.



• Measurable Properties: Properties that must be measured with a tool (ruler, beaker, graduated cylinder, scale, etc.).







Beaker



Triple Beam Balance





Graduated Cylinder

10 득

- <u>Mass</u> the amount of matter in an object or substance.
- Calculate: Using a triple beam balance or a scale.
- Unit: in science ALWAYS use grams (g) or kilograms (kg).





• <u>Weight</u> - measure of the pull of gravity on an object. Different on the MOON!!

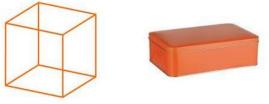




S. No	Moon or Planet	Mass (m)	Weight (W)
1	Earth	50 Kg	500 N
2	Moon	50 Kg	83 N
3	Artificial Satellite	50 Kg	0 N
4	Mercury	50 Kg	135 N
5	Venus	50 Kg	425 N
6	Mars	50 Kg	190 N
7	Jupiter	50 Kg	1320 N
8	Saturn	50 Kg	585 N
9	Urenus	50 Kg	460 N
10	Neptune	50 Kg	560 N

- <u>Volume</u> the amount of space an object takes up.
- **Measured by**: different for regular solid, irregular solid and liquids.
- Examples of Regular Solids: any solid you can measure the length, width, and height of.

length x width x height



• Examples of Irregular Solids: any solid you measur .gth, wi

• Examples of Liquids: any object that has shape but does have a definite volume.





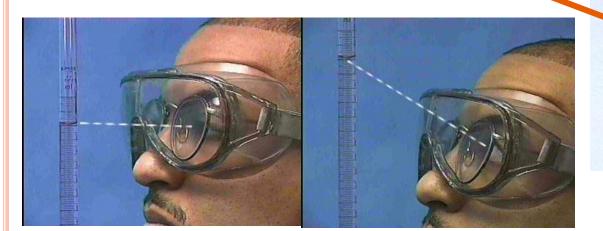
Measurable Properties of Matter Measuring the Volume of Liquids:

<u>How to calculate</u>: Use a graduated cylinder to find the volume at the meniscus.

Material: graduated cylinder, beaker, flask

How to read a graduated cylinder

- Must be at eye level to read.
- Must read to bottom of the curve. <u>MENISCUS</u> bottom of the curve.
- Unit: mL or L



• Measuring Volume of Regular Solids: measure the length, width, and height with a ruler and multiply them together.



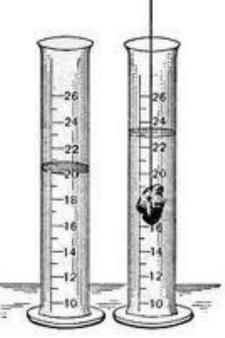
• Length x Width x Height = Volume of Regular Solid

• *ALWAYS USE CENTIMETERS IN SCIENCE!!!!

• UNIT: cm³

- Measuring Volume of Irregular Solids: Water displacement. Put water into a graduated cylinder and record volume. Place irregular solid into cylinder with water and record second volume. Subtract the two amounts.
- Initial volume (water only) volume with irregular solid = volume of solid
- UNIT: measured in mL solid use cm³.

 $1 \text{ mL} = 1 \text{ cm}^3$



• <u>Density</u> - the amount of matter in a given space or volume. Density is used to describe matter because everything has a different density.









Mass Density= Volume











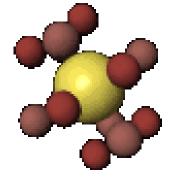
These are two, unopened full cans of soda. Explain why one is floating and one has sunk.

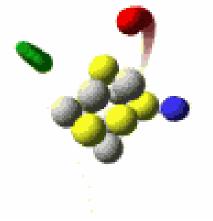
Why are some objects less dense than other objects?

As the molecules of a substance spread apart, the density of the substance is lowered.

What causes molecules to spread?

Adding energy so the movement of the molecules increases.





Objects float in other substances because they are less dense than the substance they are floating in.





DENSITY

When does an objects density change? If heat is added or taken away!!!!

HEAT – spreads out molecules – LESS dense

Take AWAY heat – molecules come together – MORE dense.

Hot objects are less dense than cool objects!!!!

CHEMICAL PROPERTIES OF MATTER

- Chemical Properties- Properties that determine whether or not a substance will react chemically.
- <u>Flammability</u> the ability to burn.







• <u>Reactivity</u> - The ability for a substance to react with another. Simply, when two substances get together, something can happen.





