






Chemistry I

- Matter
 - Pure Substance vs. Mixture
 - Properties
- 
- 
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Which of the following make up household dust?

1. Space particles
2. Skin cells
3. Man-made pollution
4. Pollen
5. All of the above



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<https://www.youtube.com/watch?v=P21a5Uty-uc>



Matter

Matter: anything that has mass and takes up space

- Classification of matter
 - **Pure substance**: made up of one type of particle; cannot be separated by physical means
 - **Mixture**: made up of two or more pure substances; can be separated by physical means

Matter is either a pure substance or a mixture



Video: What is Matter

https://www.youtube.com/watch?v=ELchwUIlWa8&ab_channel=CrashCourseKids



Mixture

Mixtures can be classified as

- **Homogeneous mixtures** (solutions): mixed uniformly; cannot see their components
 - Example: air (nitrogen, oxygen, hydrogen), steel (iron and other elements), coffee



- **Heterogeneous mixture**: have different components that you can see

- Example: granola bar, cereal



Pure Substances

Pure substances can be classified as

- **Elements**: made up of one type of atom; cannot be broken down into simpler substances (example: gold)

Periodic Table of the Elements

1	2											13	14	15	16	17	18												
H	He											B	C	N	O	F	Ne												
Li	Be											Al	Si	P	S	Cl	Ar												
Na	Mg											K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr												
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe												
Cs	Ba	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu													
Fr	Ra	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og													

Alkali Metal Alkaline Earth Transition Metal Lanthanide Actinide Metalloid Nonmetal Halogen Noble Gas Lanthanide

- **Compounds**: made up of two or more elements; can be broken down into simpler substances (example: sodium chloride)



Properties of Matter

Matter can be described by

- **Physical properties**: characteristics that can be observed or measured without changing its chemical identity (examples: colour, texture)
- **Chemical properties**: describe the ability of matter to react with another substance to form different substances (examples: combustibility, lack of reactivity)



Physical Properties

<u>Colour</u>	The colour of the substance or material
<u>Malleability</u>	The ability for metals to be hammered or rolled into a thin sheet
<u>Texture</u>	The feel, appearance, or consistency of a surface or a substance.
<u>Viscosity</u>	A measure of a fluid's resistance to flow (i.e., low viscosity flows easily)
<u>Conductivity</u>	The ability to conduct/transmit heat, electricity, or sound
<u>State of matter</u>	Solid, liquid, or gas
<u>Melting point</u>	The temperature where a substance changes from solid to liquid
<u>Boiling Point</u>	The temperature where a substance changes from liquid to gas
<u>Hardness</u>	A description of how hard or soft a material is
<u>Solubility</u>	The ability for a substance to be dissolved into a liquid
<u>Ductility</u>	The ability of a material to have its shape changed without losing strength or breaking

Chemical Properties

Combustibility

How easily a substance bursts into flame

Reactivity

The tendency for a substance to undergo a chemical reaction



Physical Change

- A change to physical properties of a substance.
- They are usually reversible.
- E.g.: crushing a can, shredding paper, melting an ice cube



Chemical Change

- A process in which one or more substances are altered into one or more new and different substances.
- A chemical reaction involving the rearrangement of atoms.
- Also known as a chemical reaction.
- E.g.: cooking an egg, metal rusting, a fire burning
- Signs of a chemical change:
 - Bubbling
 - Changes in colour
 - A new substance is formed
 - Release of heat and light
 - Change in odour



Video: Physical vs Chemical Change

https://www.youtube.com/watch?v=x49BtB5dOwg&ab_channel=FreeSchool



Video: The chemistry of cookies

<https://www.youtube.com/watch?v=n6wpNhyreDE>



Is it possible to unboil an egg?

https://www.youtube.com/watch?v=CHMY4G9gTPA&ab_channel=TED-Ed

Practice

Matter Flow Chart

