



SAFALTA CLASSTM

An Initiative by **अमरउजाला**

DELHI POLICE CONSTABLE

By
**ONE OF THE MOST EXPERIENCED
FACULTY TEAM FROM DELHI**

100+ Hrs | 60 Days

DELHI POLICE – CONSTABLE - 60 DAYS COURSE

•LIVE **ONLINE CLASSES**

 **60 DAYS** | **100+ HOURS**

NEW BATCH STARTS 17th AUGUST 2020

Session Time - SESSION -1: 3:30 PM TO 4:30 PM & SESSION- 2: 5: 00 - 6:00 PM

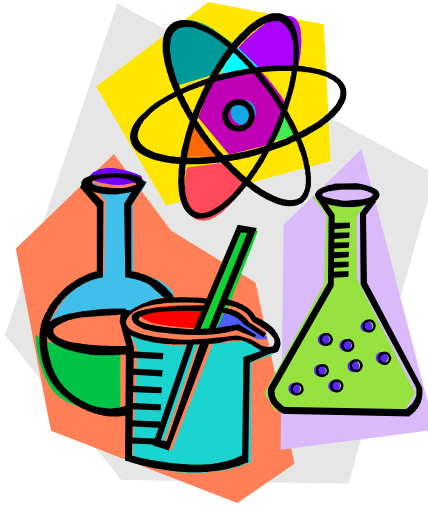
Course *Benefits*

- Live Interactive Classes on Zoom
- Accessible from Desktop or Mobile
- Access to recorded classes
- Weekly mock tests to evaluate progress
- PDF Study material to boost your preparation
- Special Q&A Sessions
- Daily Current Affairs
- Special Vocabulary Sessions
- Dedicated Telegram group
- Personalized Counselling Sessions

For more details follow the link or Scan the QR Code

<https://bit.ly/33MNcpb>



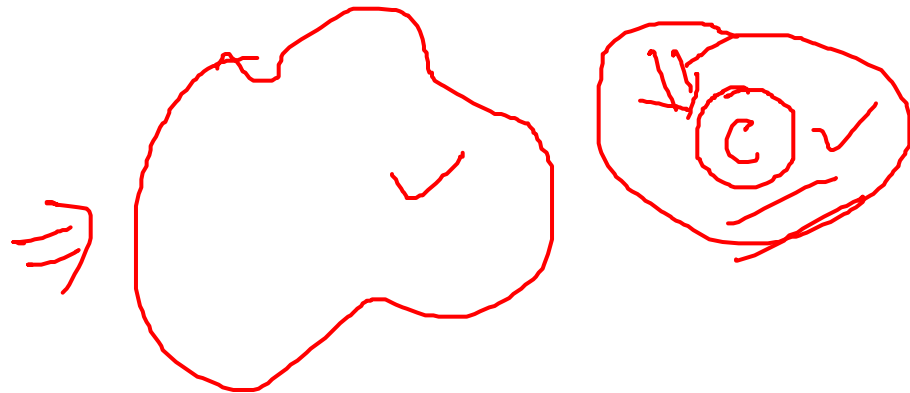


A Matter of Fact

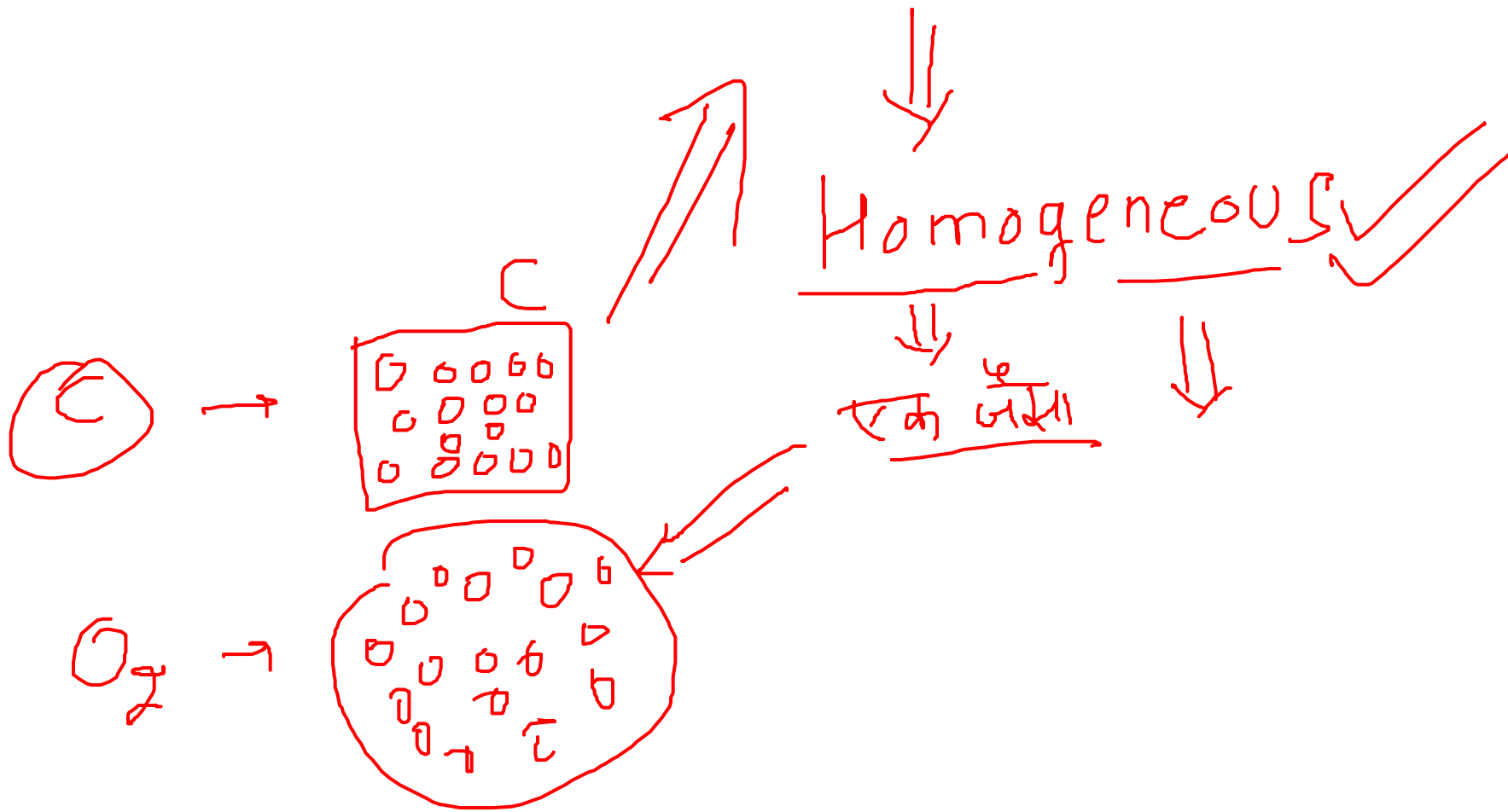
Mixtures, Elements and Compounds

Atom → element → Compound
→ mixture

element:- (atom) Carbon



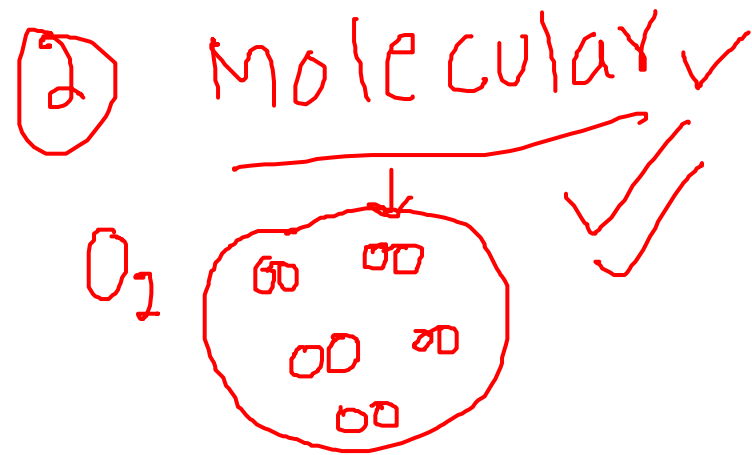
Pure Substance



Simple Substance (x)



* element \Rightarrow ① Atomic form



Element →

Homogeneous

(Single ^{type} Atom)

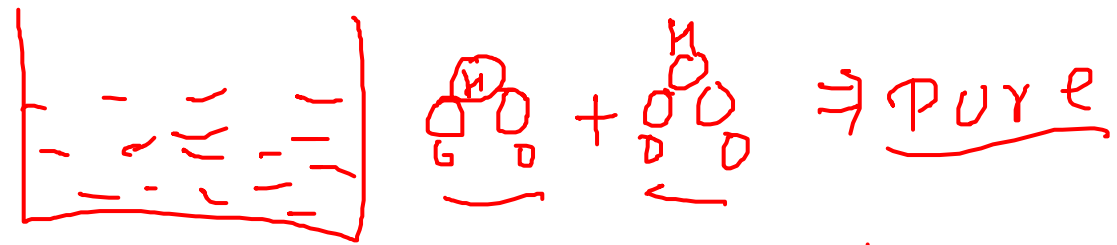
Compound (Pure Subs.)

Comp. ⇒ 2 or
more than 2 elements (fixed ratio)

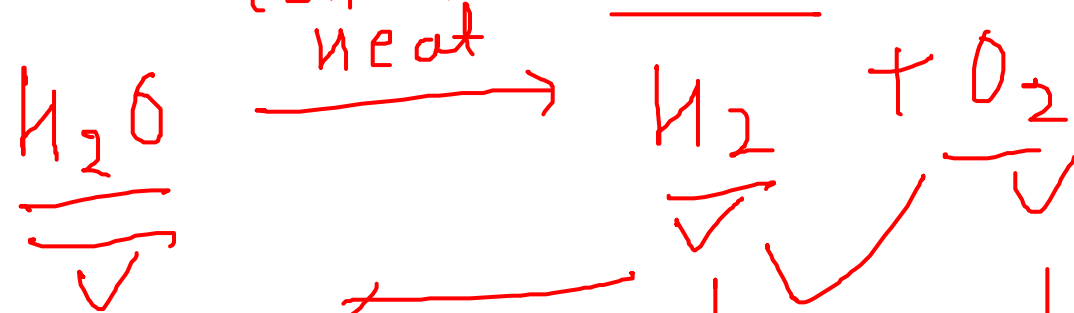
ex: H₂O ⇒

✓
✓
O O ⇒ Pure Subs.

⇓
Homogeneous



(chemical changes) ✓



element \Rightarrow 110

*

Matter

Pure Subs.

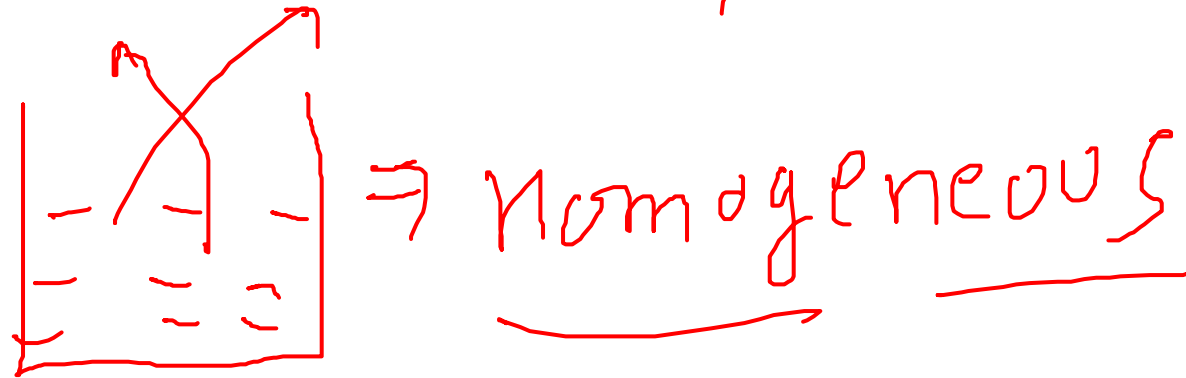
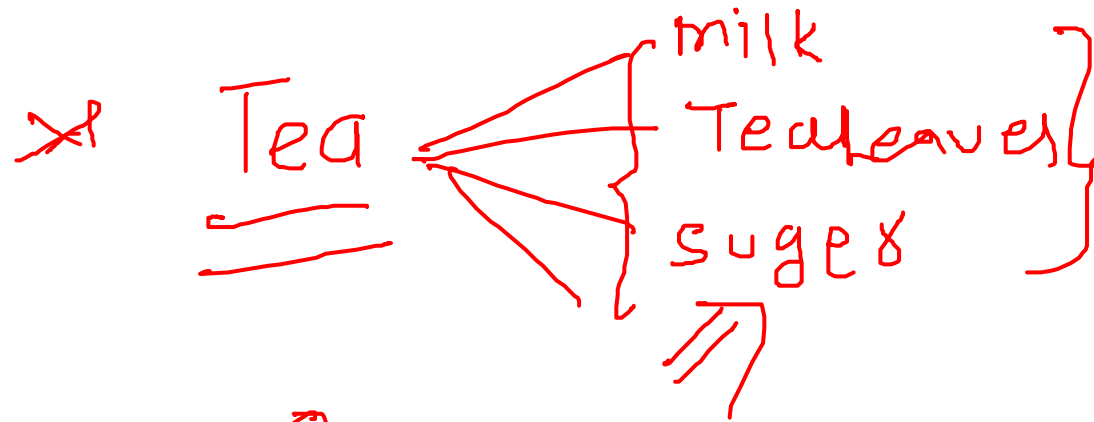
Imp. Subs.

(mixt)

Homogeneous

Heteroge

Homogeneous



Heterogeneous



oil + water

Soup \Rightarrow

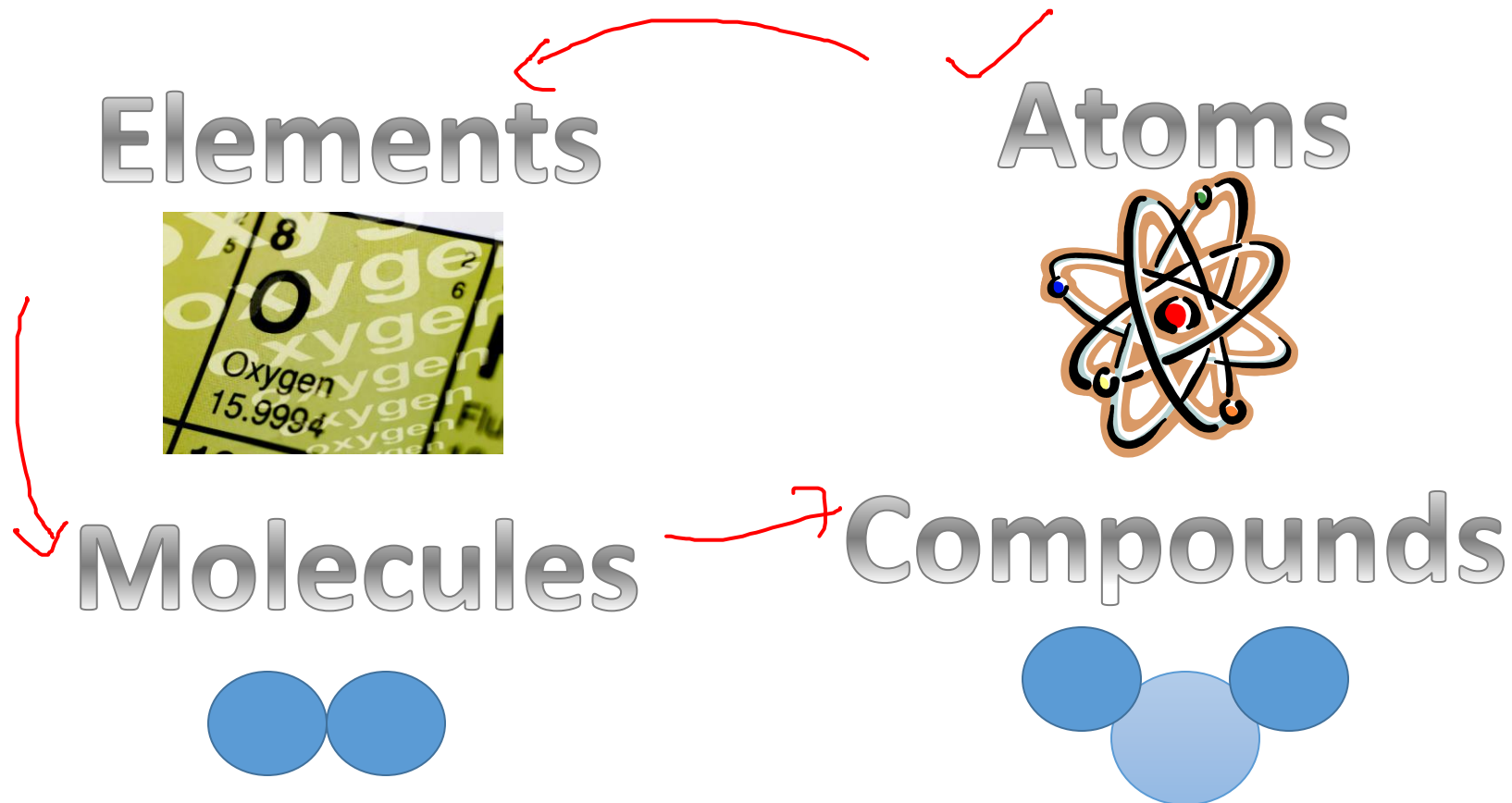
mixtve

What is Matter

- ✓ • Matter is anything that has mass and takes up space
- ✓ • Matter is made up of atoms. An atom is the smallest unit of matter
- ✓ • Atoms can combine or bond to form a molecule

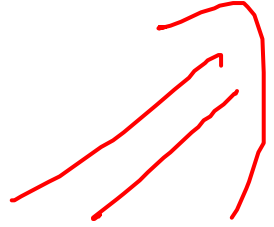
Pure Substances

- A sample of matter that has definite chemical and physical properties.



-

Compounds



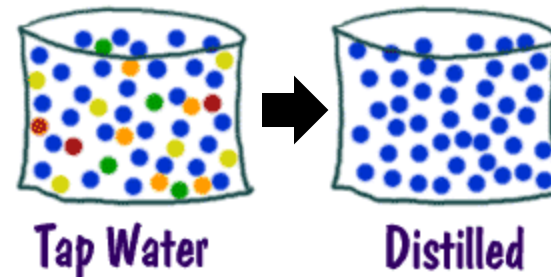
Pure substance composed of two or more *different elements joined by chemical bonds.*

- Made of elements in a specific ratio that is always the same
- Has a chemical formula
- Can only be separated by chemical means, not physically



Mixtures

- A combination of two or more pure substances that are **not chemically combined**.
- substances held together by *physical forces, not chemical*
- No chemical change takes place
- Each item retains its properties in the mixture
- They can be separated physically



Can you identify the following?

You will be shown a series of photos. Tell if each photo represents an item composed of an element, compound, or mixture.

Review:

- An **element** contains just one type of atom.
- A **compound** contains two or more different atoms joined together.
- A **mixture** contains two or more different substances that are only physically joined together, not chemically.
 - A mixture can contain both elements and compounds.

Element, Compound, or Mixture?

→ Rocks



Element, Compound, or Mixture?

Rocks



Element, Compound, or Mixture?

Copper



Element, Compound, or Mixture?



Copper

Cu



Element, Compound, or Mixture?

✓ Jelly Beans



Element, Compound, or Mixture?

Jelly Beans



Element, Compound, or Mixture?

Table Sugar



Element, **Compound**, or Mixture?

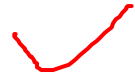


Table Sugar



Element, Compound, or Mixture?

✓ Diamond



Element, Compound, or Mixture?



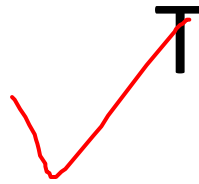
C

Diamond



Element, Compound, or Mixture?

Tea



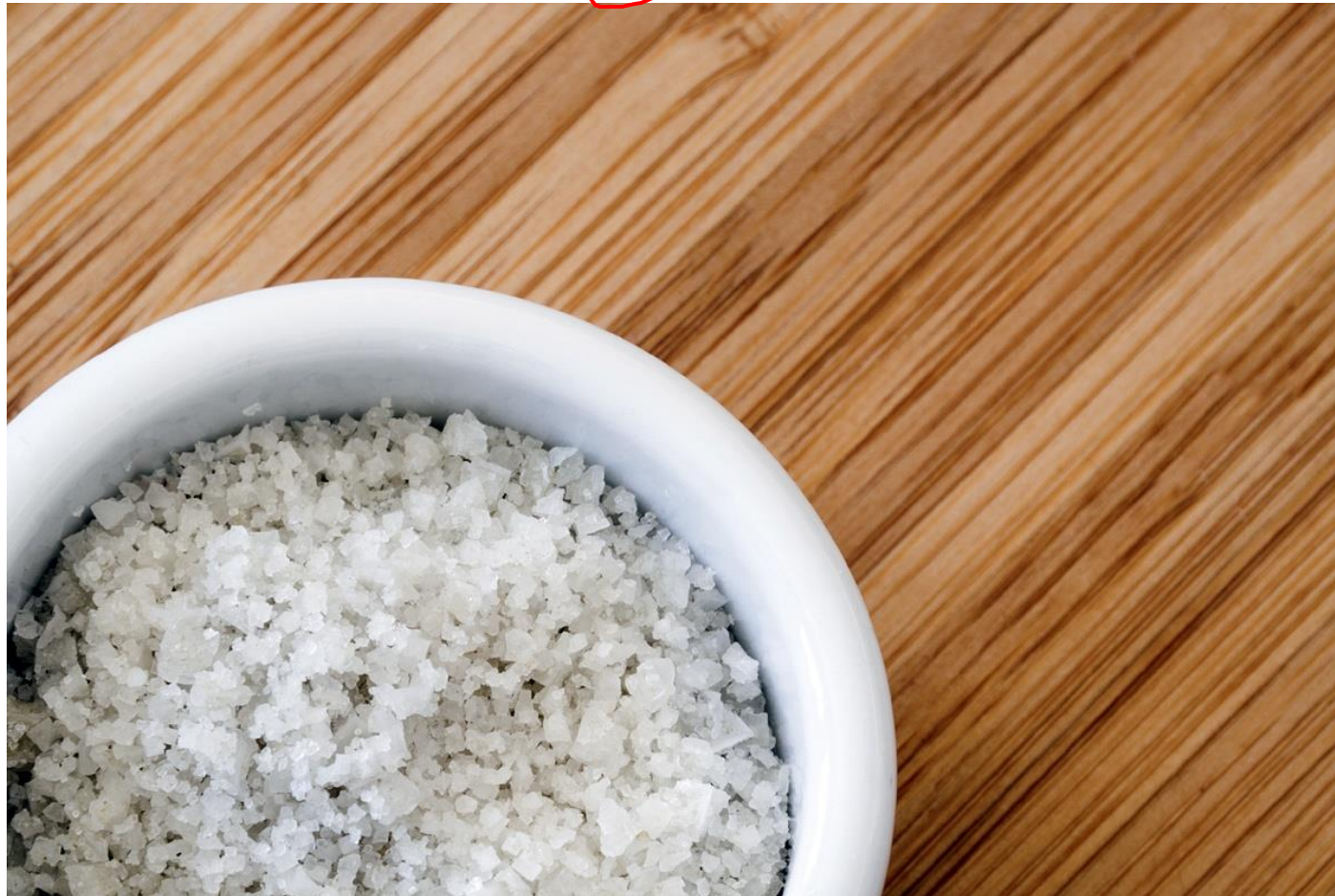
Element, Compound, or Mixture?

Tea



Element, Compound, or Mixture?

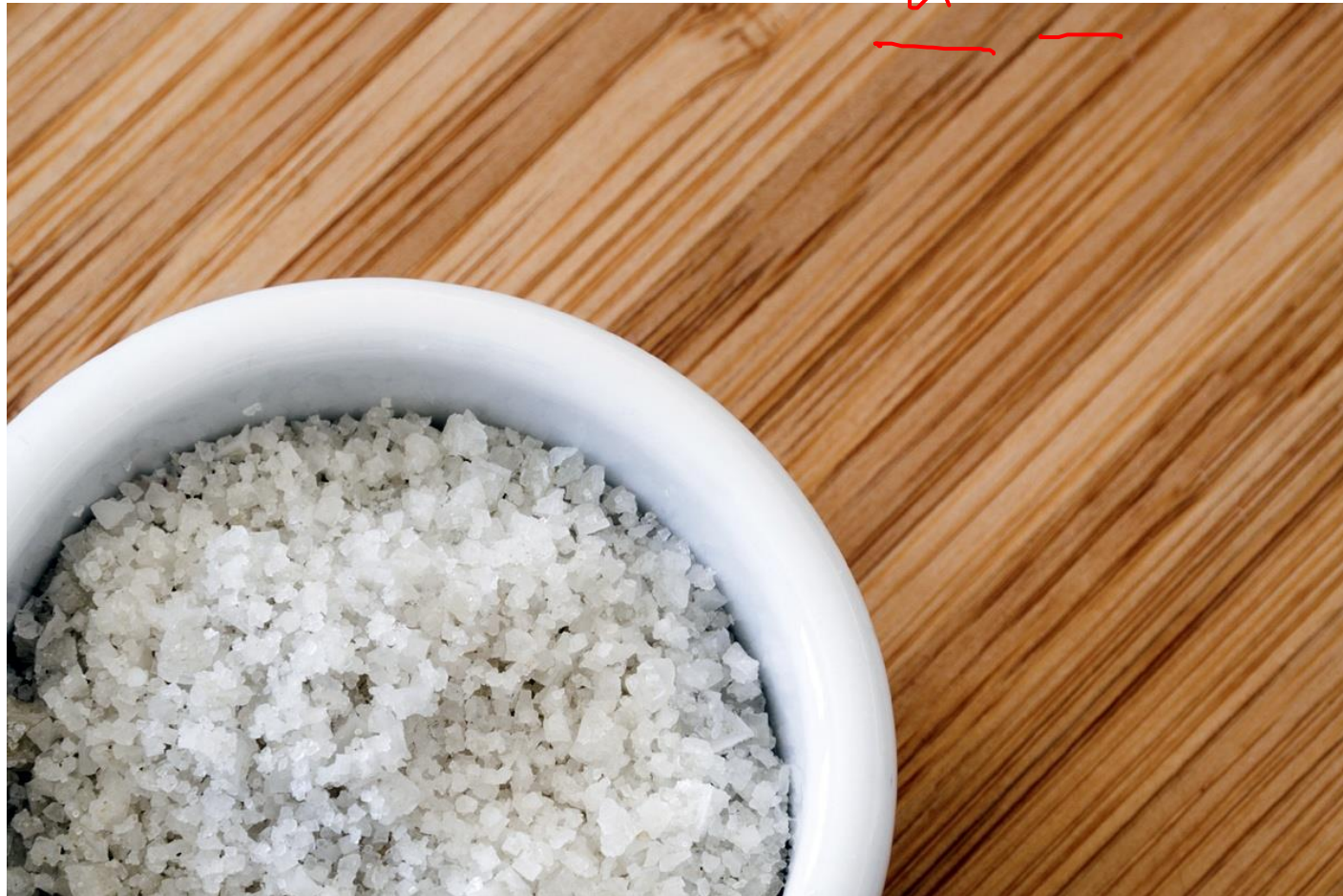
Salt



Element, Compound, or Mixture?

NaCl

Salt



Element, Compound, or Mixture?

{ Neon Gas }



Element, Compound, or Mixture?

Ne

Neon Gas



Element, Compound, or Mixture?

Salad



Element, Compound, or Mixture?

Salad



Element, Compound, or Mixture?

{ Pure Water }



Element, **Compound**, or Mixture?

Pure Water



Element, Compound, or Mixture?

Aluminum



Element, Compound, or Mixture?

Aluminum

Al



Element, Compound, or Mixture?

{ Lemonade }



Element, Compound, or Mixture?

Lemonade



Element, Compound, or Mixture?

Silver



Element, Compound, or Mixture?

Silver

Ag



Element, Compound, or Mixture?

Sand



Element, Compound, or Mixture?

Sand



Types of Mixtures



- **Two main categories**

- ✓ • **Homogeneous** – molecules are mixed up in an even distribution
- ✓ • **Heterogeneous** – molecules are **not** mixed up in an even distribution

Homogeneous Mixtures

- Solutions - a well mixed mixture—appears to be a single substance
 - Solute - the substance being dissolved
 - Solvent – the substance in which the solute is being dissolved
 - water is considered a universal solvent
 - Particles do not scatter light
 - Ex: coffee, lemonade, Kool-Aid

Homogeneous Mixtures

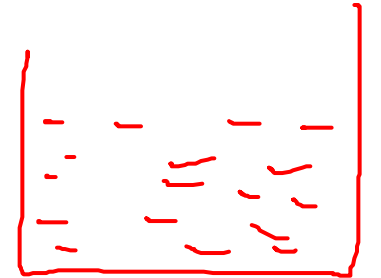
- • **Colloids**- a mixture of ~~tiny~~ particles that are bigger than those in a solution, but smaller than in a suspension

- Do not settle out over time

- Scatter light

- Ex. Mayonnaise, milk, gelatin, whipped cream

Solution →

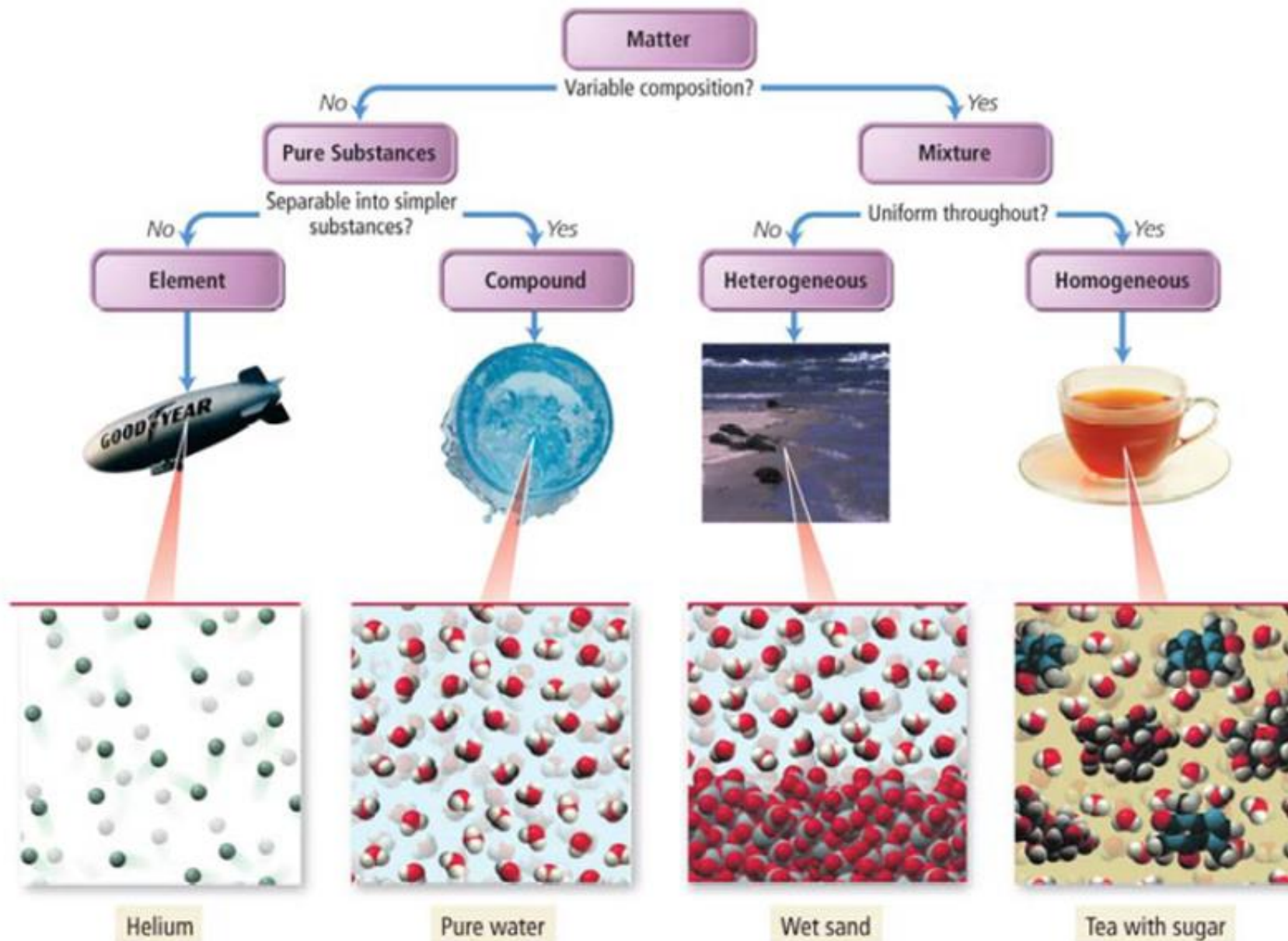


✓
✓

Heterogeneous Mixtures

- Suspensions – a mixture in which particles are dispersed in liquid or a gas and will eventually settle out
 - Particles can scatter light
 - Can be filtered out using a filter → Insol.
 - Ex. Snow globe, sand in a bucket of water, muddy water, Italian salad dressing





Difference Between Compound and Mixture

| Sl. No. | Differentiating Property | Compound | Mixture |
|---------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1 | Definition | Compound are substances which can be formed by chemically combining two or more elements. | Mixtures are substances that are formed by physically mixing two or more substances. |
| 2 | Types | <p>Compounds can be of three types, which are: covalent compounds, metallic compounds and ionic compounds.</p> <p>Note: Compounds can be classified as organic compounds or inorganic compounds depending on the presence of carbon in the molecular</p> | Mixtures are mainly of two types i.e. homogenous mixtures and heterogeneous mixtures. |

| | | | |
|---|----------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Substance Category | Compounds fall under pure substances. | Mixtures can be categorized as impure substances. |
| 4 | Composition Details | The chemical composition of compounds is always fixed. | A mixture can have a variable composition of the substances forming it. |
| 5 | Nature | Compounds are always homogeneous in nature | Mixtures can either be homogeneous or heterogeneous in nature. |
| 6 | Separation of Constituents | The constituents of a compound can only be separated by either chemical or electrochemical methods(like extraction). | Mixtures can be separated into their constituents via physical separation methods such as filtration. Thus, the separation of mixtures is relatively easier than the separation of chemical compounds. |

| | | | |
|----|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | Properties | The properties of compounds are unique to themselves and need not necessarily reflect the properties of the constituent elements. | The constituents of a mixture do not lose their properties and so, the properties of a mixture are generally the sum of the properties of its constituents. |
| 8 | New Substance | A new substance is formed after the constituents are chemically combined. So, a compound has different properties from its constituents. | No new substances are formed in mixtures and their properties are dependent on the properties of their respective constituents. |
| 9 | Melting and Boiling Points | The melting & boiling points of a compound are always defined. | The melting and boiling points of a mixture is not defined. |
| 10 | Example | Water, salt, baking soda, etc. | Oil and water, sand and water, smog (smoke + fog), etc. |

Chemical and physical changes



Physical Change

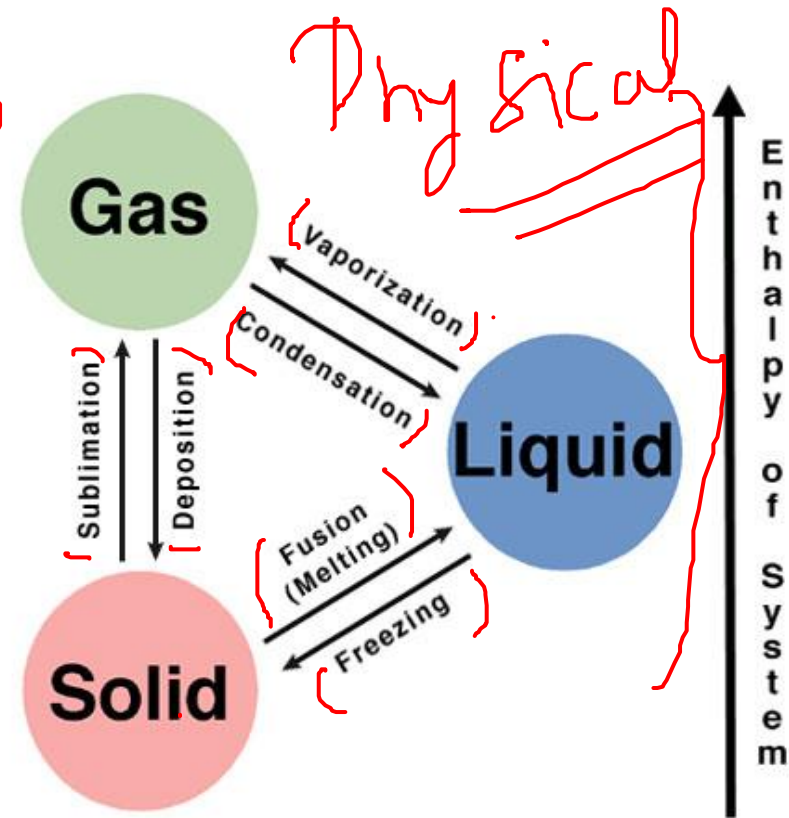
- A **Physical change** is a change in a substance that does not change what the substance is.



Physical Change - examples

- **Examples** of physical change include:

- Change in shape
- Change in size
- Change in phase
 - Melting (solid to liquid)
 - Boiling (liquid to gas)
 - Evaporation (liquid to gas)
 - Condensation (gas to liquid)
 - Freezing (liquid to solid)
 - Sublimation (solid to gas)
 - Deposition (gas to solid)



Physical Change

- Physical changes might be caused by:
 - Grinding
 - Cutting
 - Crushing
 - Bending
 - Breaking
 - Heating/cooling
 - (change in phase)
 - squishing



Physical Change

- **Evidence that a physical change has occurred might include:**

- Change in shape
- Change in form
- Change in size
- Change in **phase** (This is always a physical change!)
- Physical changes are usually reversible

ice → water



Physical change

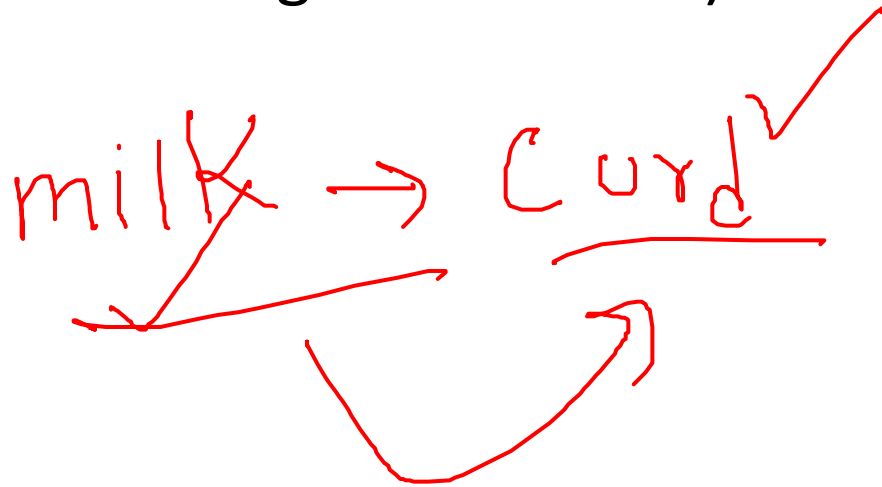
- What could you do to these items to cause a physical change to occur?



Chemical change

- A **chemical change** is a change in which a substance is changed into a different substance.
(You've changed what it **is**.)

milk → Curd ✓



The diagram shows the word 'milk' with a red arrow pointing to the word 'Curd'. The word 'Curd' is underlined and has a checkmark next to it. A red arrow also points from the underlined 'k' in 'milk' to the underlined 'C' in 'Curd', indicating a chemical change.



Chemical change

- **Examples** of chemical changes include:

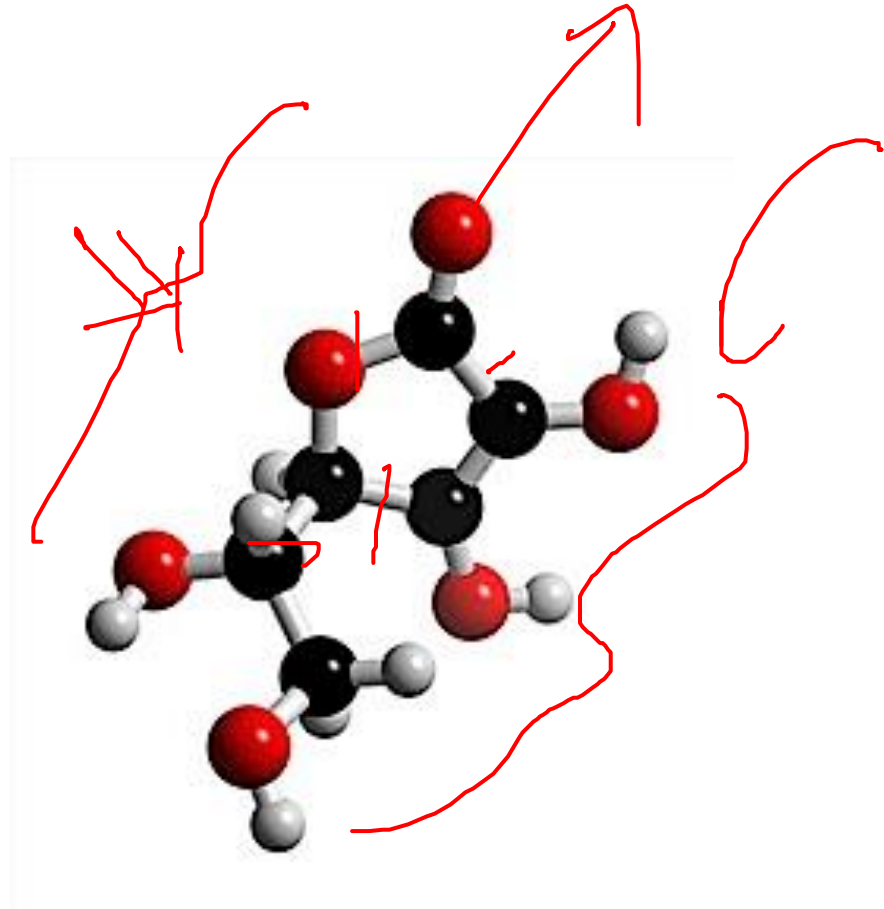
- Burning
- Rusting
- Tarnishing
- Decomposing
- Polymerization

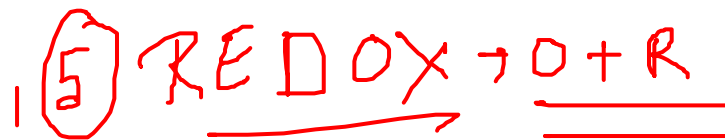
in time



Chemical change

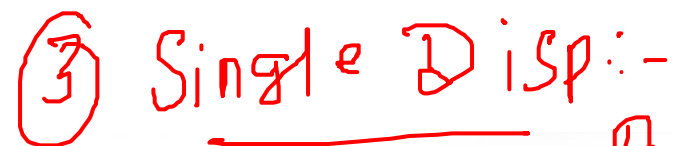
- Chemical changes occur when a **chemical reaction** causes bonds between atoms to break or to form.





Chemical change – Chemical reactions

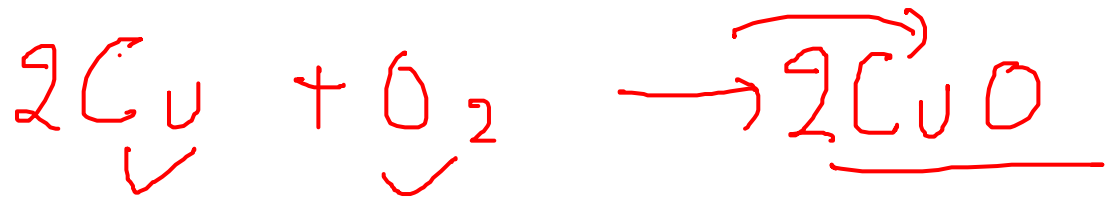
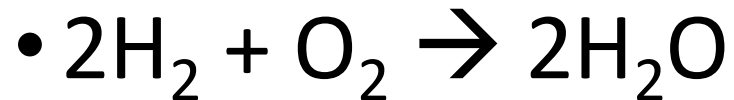
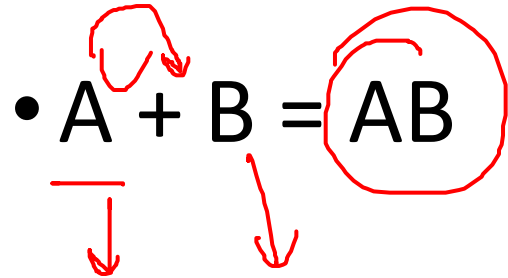
- There are **5 types of chemical reactions** that cause chemical changes to occur.



Chemical change – Chemical reactions

- 1- Composition reactions

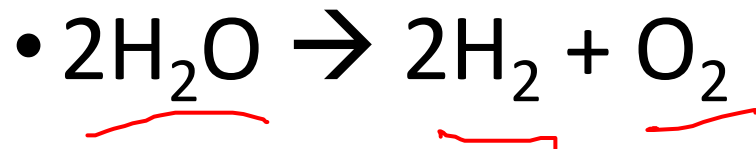
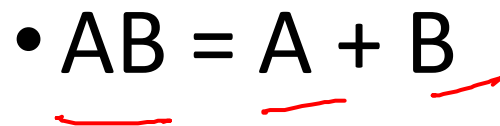
- Two things come together to form something new



Chemical change – Chemical reactions

- 2- Decomposition reactions

- 1 thing breaks apart to form 2 or more things.

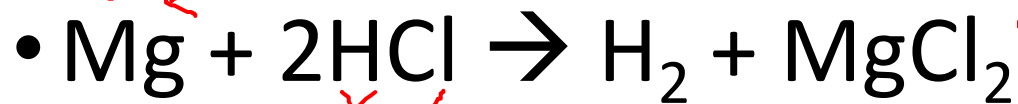
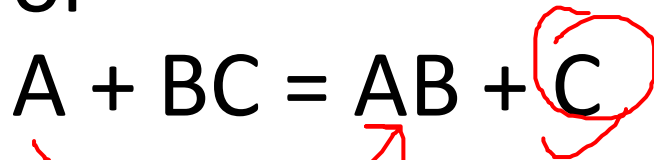
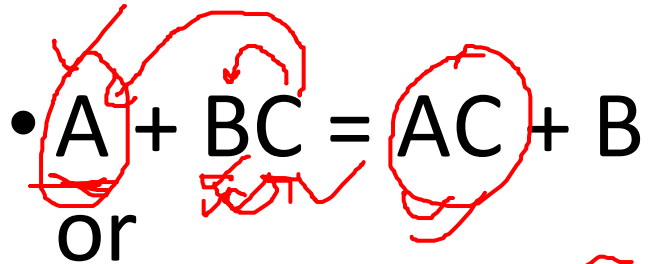


Chemical change – Chemical reactions

- 3- Single replacement reactions

Replacement → 2

- One atom replaces another atom

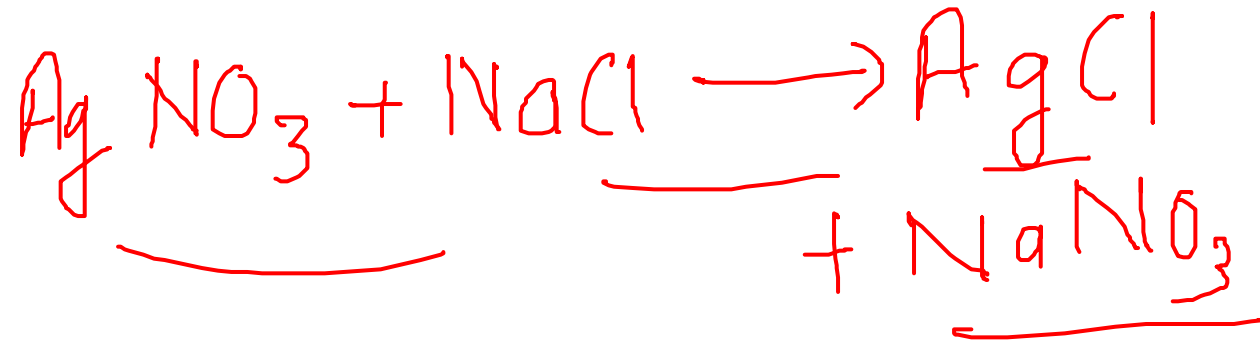


Chemical change – Chemical reactions

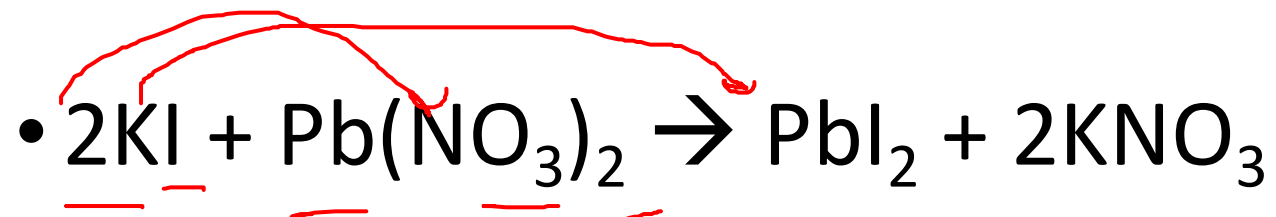
- Double replacement reactions



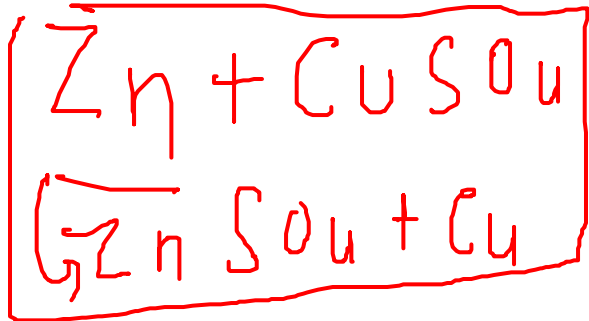
- Two chemicals switch places



- $\text{AX} + \text{BY} = \text{AY} + \text{BX}$



Reactivity Series



| | |
|----------|------------|
| Please | Potassium |
| Stop | Sodium |
| Calling | Calcium |
| me | Magnesium |
| a | Alum. |
| careless | (Carbon) |
| zebra | ✓ Zinc ✓ |
| instead | Iron |
| try | Tin |
| learning | Lead |
| How | (Hydrogen) |
| copper | ✓ Copper ✓ |
| saves | Silver |
| Gold | Gold |

in cycle



✕ ✕ Rancidity

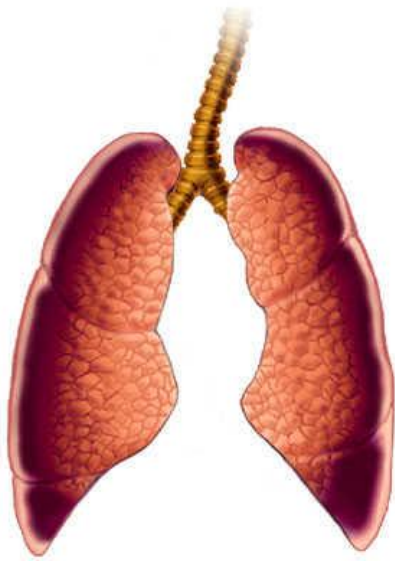
milk → Colloid mix , emulsion

(Fe) Corrosion

Chemical change – Chemical reactions

- Combustion reaction

- A substance combines with oxygen and releases energy.
- C_3H_8 (propane) + $5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$



Chemical Change: Evidence

- Evidence that a chemical change has occurred might include:
 - ✓ A color change
 - ✓ An odor change
 - Formation of a precipitate (you mix two liquids and make a solid)
 - Gas is formed (bubbles)
 - Changes in physical properties.



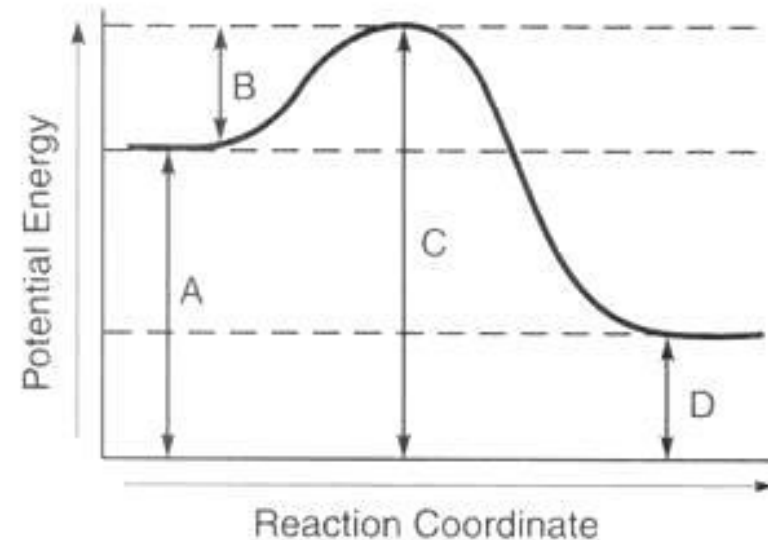
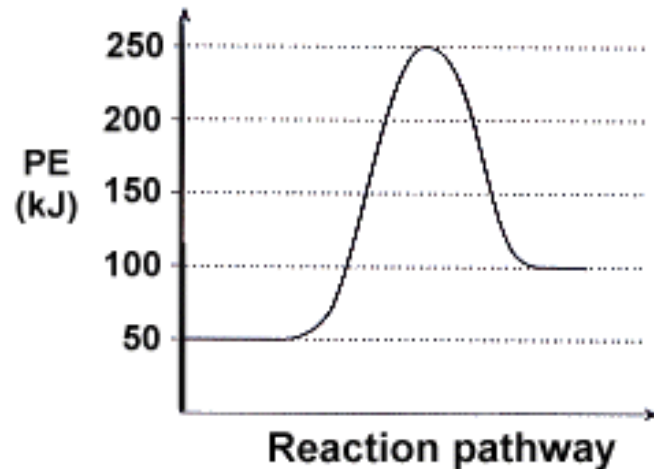
Physical and Chemical change

- During a chemical change **energy can be released** in the form of:
 - ✓ • Heat
 - ✓ • Light



Chemical change – Chemical reactions

- When a chemical change occurs, energy is either released or absorbed.



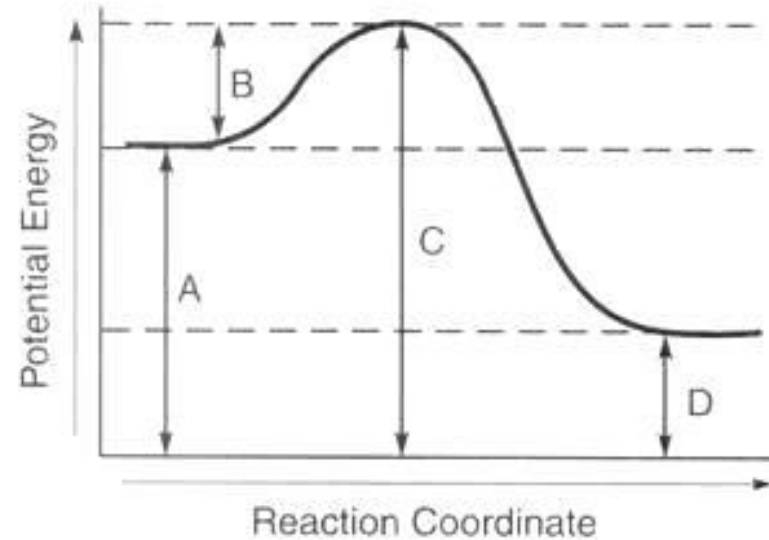
Physical and Chemical change - heat

~~*~~ • A chemical reaction that releases energy in the form of heat is called **exothermic**.

- Heat comes OUT
 - Exo = out
 - Thermic = heat
- It will feel HOT.



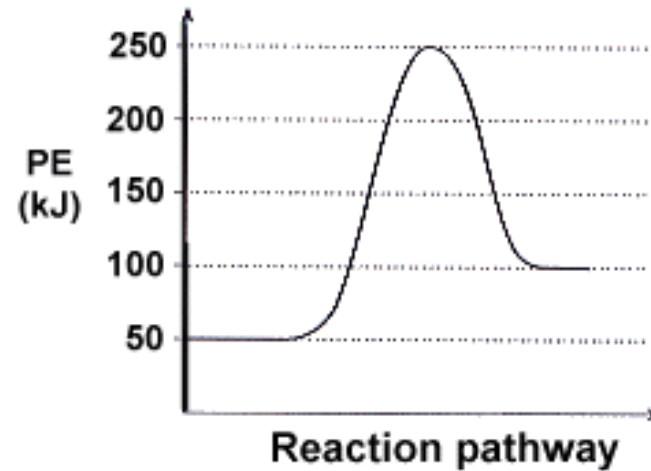
Heat
Release



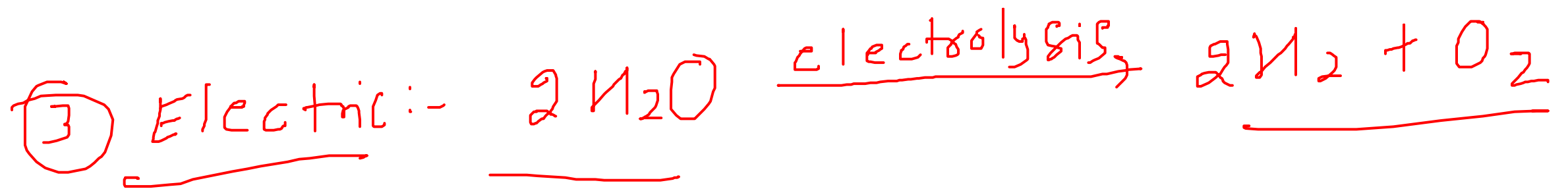
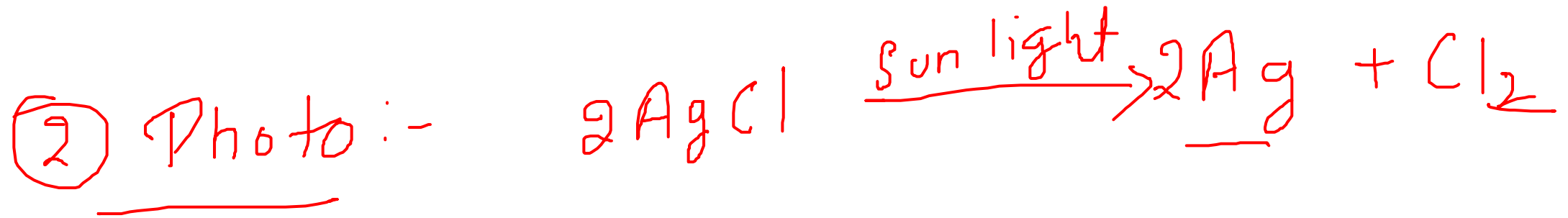
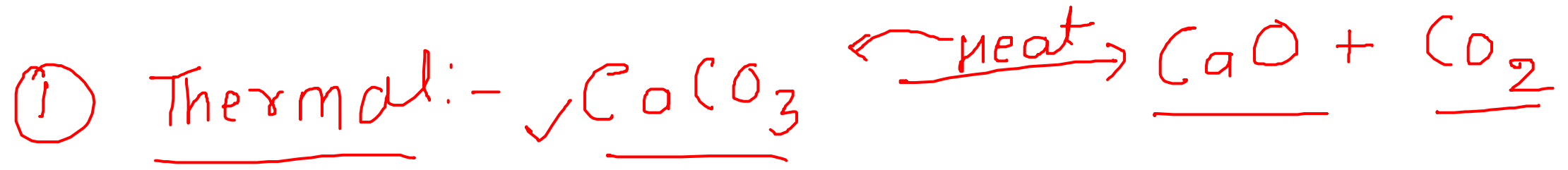
Physical and Chemical change - heat

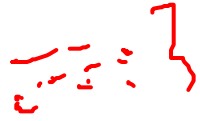
- A chemical reaction that absorbs energy in the form of heat is called **endothermic**.

- Heat goes IN
 - Endo = in
 - Thermic = heat
- It will feel COLD



* Decomposition Reaction:-





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video**

$$\begin{array}{r} \underline{V_2} - \underline{V_2} \downarrow \\ = - \downarrow \text{Ret.} \end{array}$$



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