

## Classification of matter

- We can broadly classify matter by how difficult it is to separate

### PURE SUBSTANCES

- CANNOT be separated into different materials by PHYSICAL PROCESSES

#### Examples:

Table salt, gold, silver, nitrogen, oxygen, carbon, hydrochloric acid, carbon dioxide, ethanol (grain alcohol), water, silicon dioxide

### MIXTURES

- CAN be separated into other materials by PHYSICAL PROCESSES

#### Examples:

salt water, vodka, air, toilet bowl cleaner, beef, macaroni and cheese, dirt

## More on PURE SUBSTANCES

- Pure substances can be further classified, depending on how easy it is to separate them by CHEMICAL PROCESSES

### ELEMENTS

- Cannot be broken down into simpler substances using physical or chemical means
- Elements are the building blocks of chemistry! They are the simple things from which all other things are formed!
- Listed on the PERIODIC TABLE OF THE ELEMENTS

Examples:

gold, silver, carbon, nitrogen, oxygen

### COMPOUNDS

- Can be broken down into simpler substances using chemical means
- Are made of ELEMENTS combined in simple, fixed ratios
- A compound, no matter how it was made, has a definite ratio of one atom to another (LAW OF CONSTANT COMPOSITION)

$H_2O$ : 2 parts hydrogen to one part oxygen!

Examples:

carbon dioxide, hydrochloric acid, ethanol, water

## More on MIXTURES

- Mixtures can be further classified based on uniformity

### HOMOGENEOUS MIXTURES

- uniform in composition and properties throughout
- physical properties the same at any point in the mixture

#### Examples:

salt water, toilet bowl cleaner, vodka

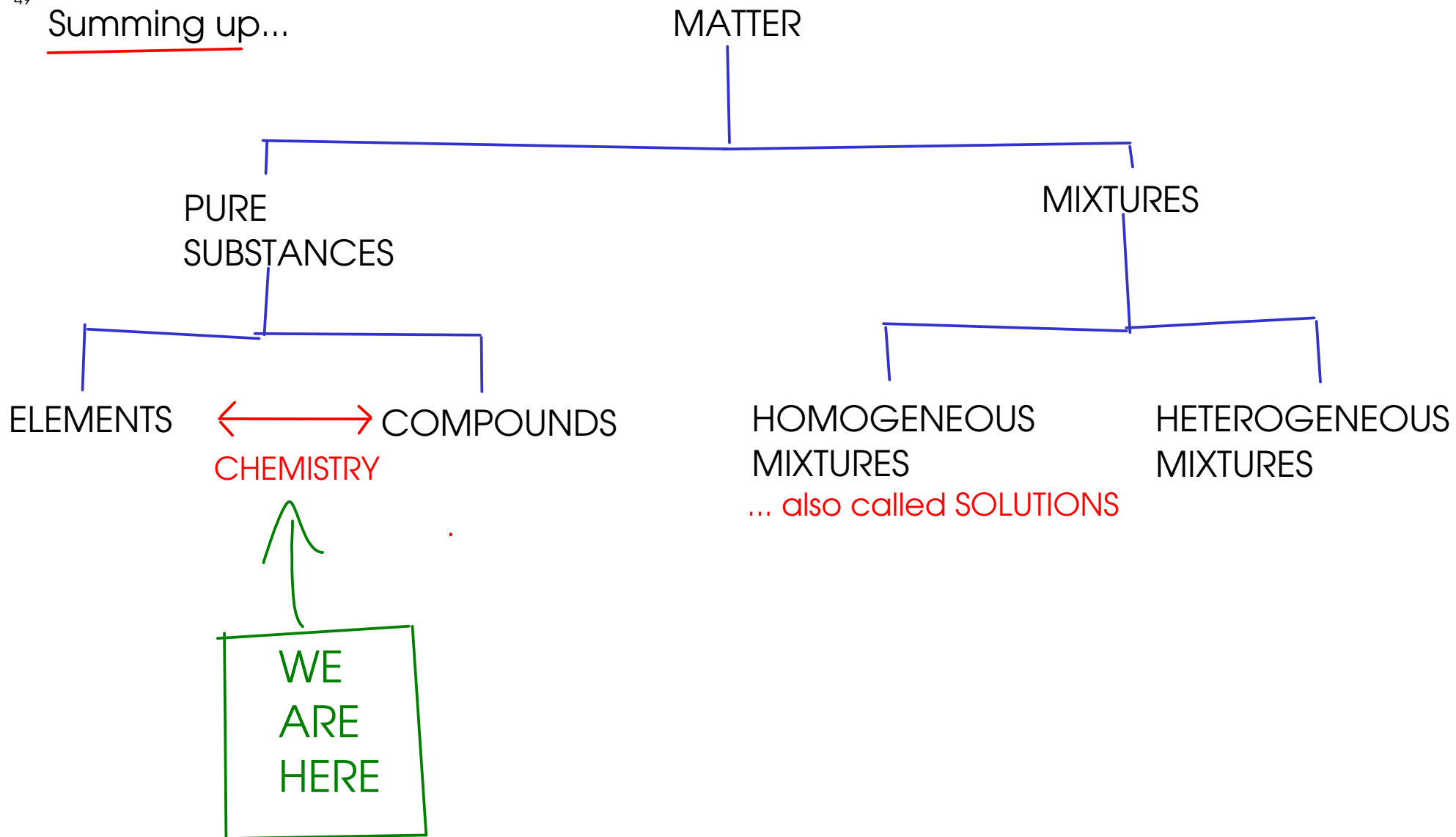
"solutions"

### HETEROGENEOUS MIXTURES

- nonuniform
- physical properties may differ (sometimes dramatically) at different points in the mixture

#### Examples:

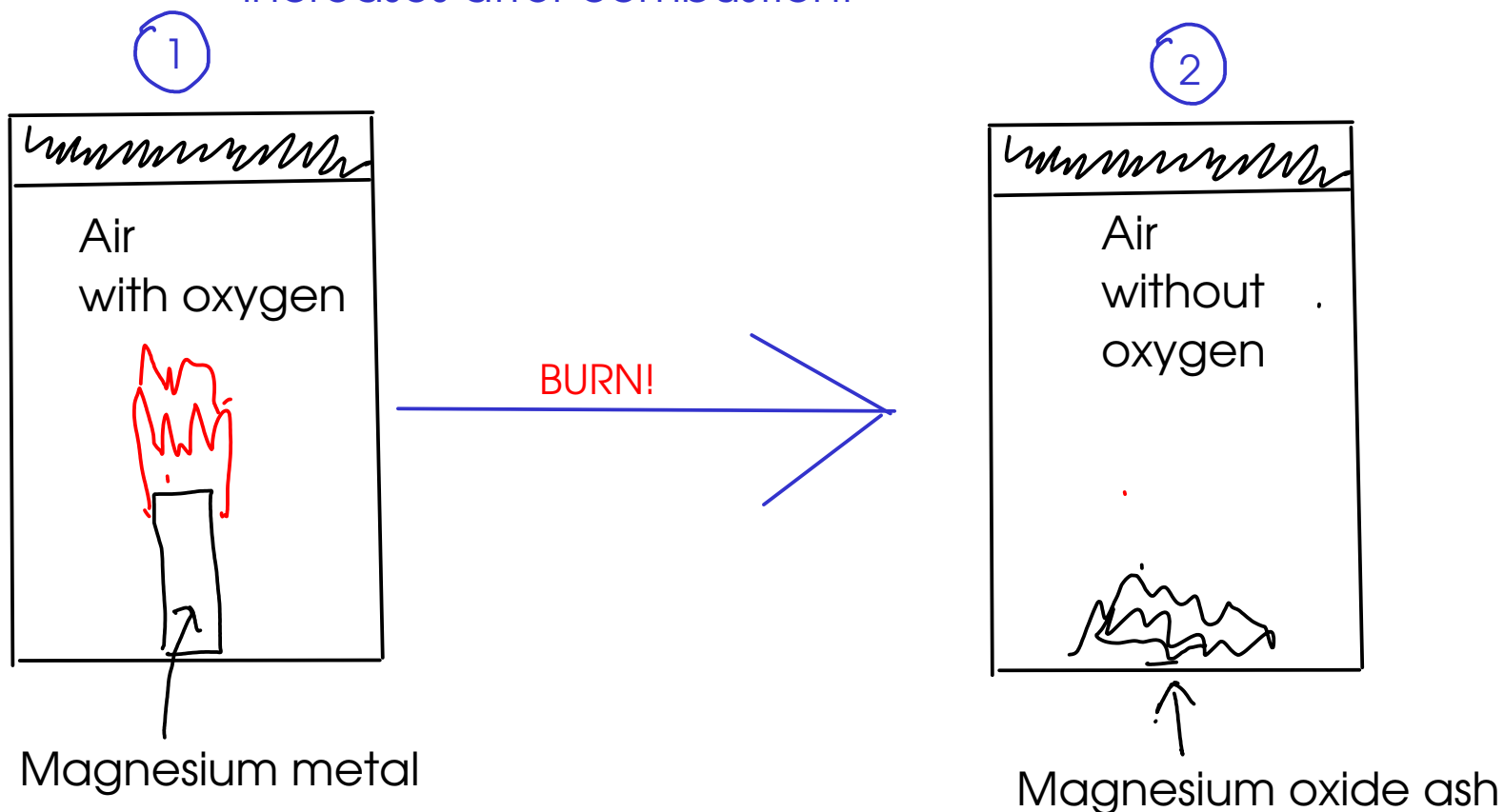
beef, dirt, macaroni and cheese

Summing up...

## Conservation of mass

- During any chemical or physical process, the overall amount of mass remains constant, even if the chemical identity or physical state of the matter involved changes

\* Total mass remains constant from (1) to (2), even though the mass of the GAS decreases and the mass of the SOLID increases after combustion!



End of material for Test #1

Test 1:

Chapters 1, 2, 3