



Pure Substances, Mixtures, and
Solutions

Separating Matter into 3 classifications:

- Pure substance: matter that has a fixed (constant) composition and unique properties. Contains only 1 type element or compound; homogeneous
 - Mixture: Contains at least 2 **PHYSICALLY** combined compounds; can be homogeneous or heterogeneous

Homogeneous Substances

- Means same throughout
- 1) element: only 1 type of atom
- 2) compound: 2 or more **CHEMICALLY** combined elements (not easily separated from each other)
ex: water, CO₂
- 3) Solution: a special kind of mixture 2 phases/parts (SOLUTE dissolves & SOLVENT does the dissolving)
ex: moist air (H₂O in Air); sterling silver (Cu in Ag...called an alloy)

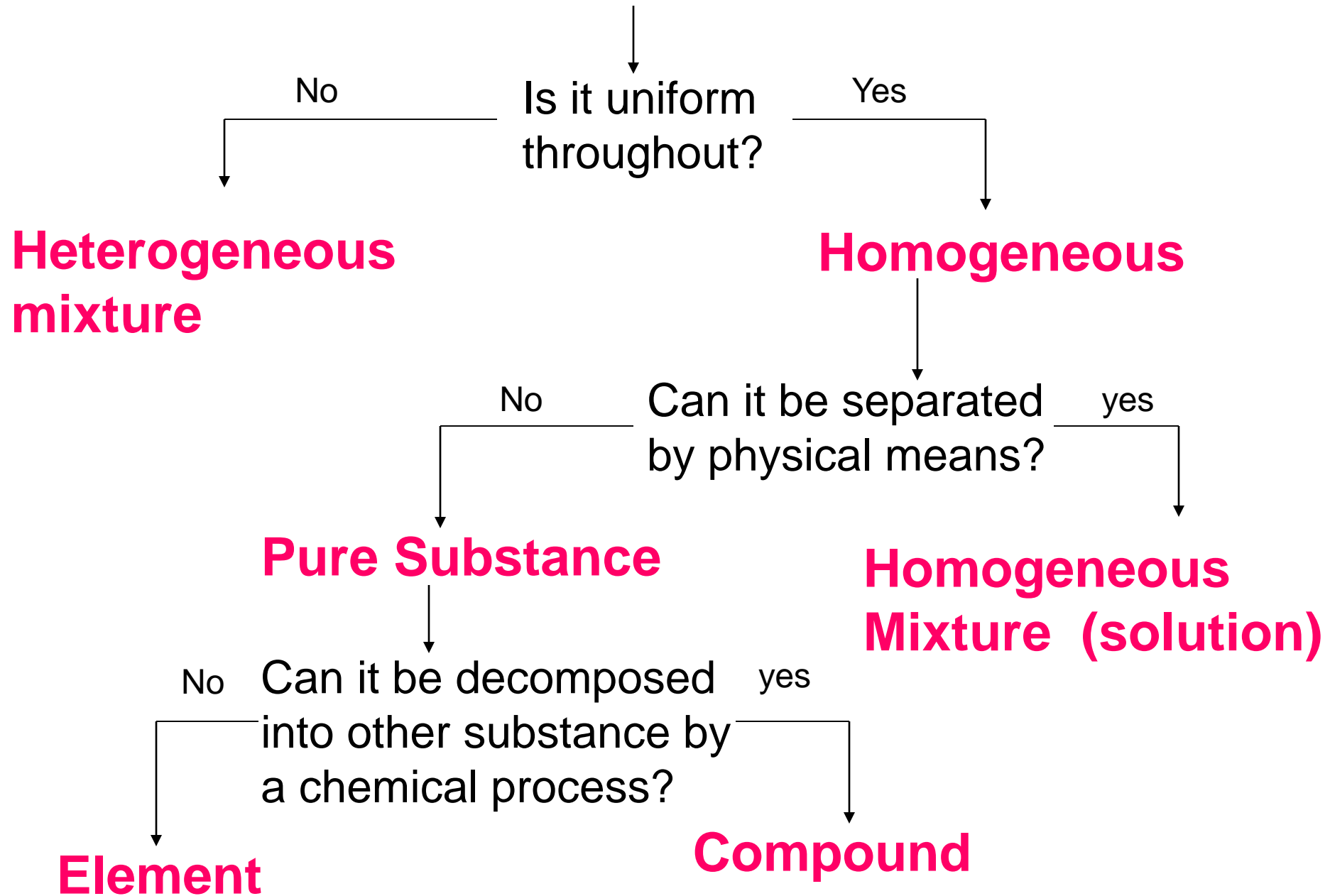
Heterogeneous matter

- Means different throughout
- Always a MIXTURE (solutions are mixtures that are NOT heterogeneous)
 - 2 or more PHYSICALLY combined substances (elements/compounds)
 - ex: blood, air, muddy water

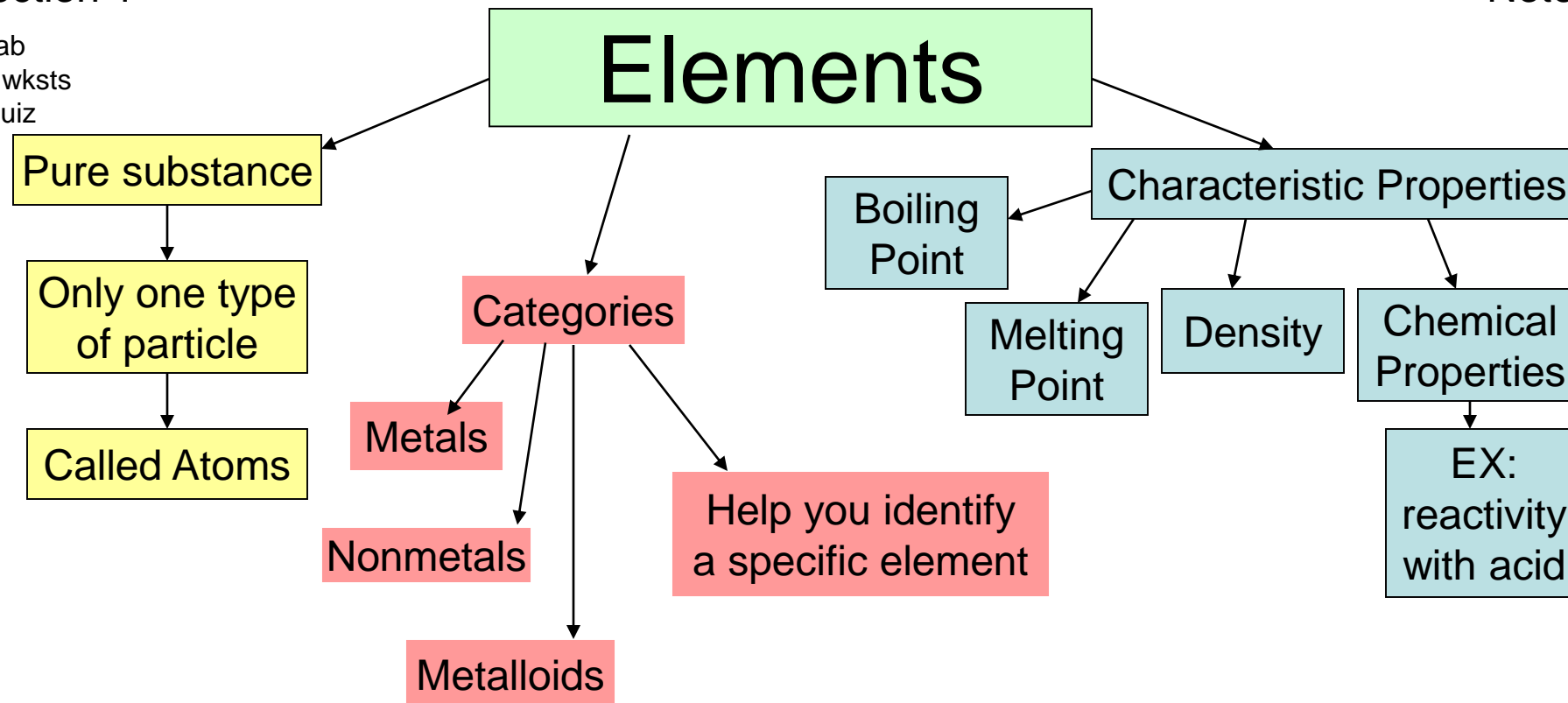
Separating Matter into 3 classifications:

- Matter can also be classified according to its composition. Mixtures can be homogeneous or heterogeneous.
- Mixtures can be separated into pure substances, and pure substances can be either compounds or elements.

MATTER



- * Lab
- * 2 wksts
- * Quiz



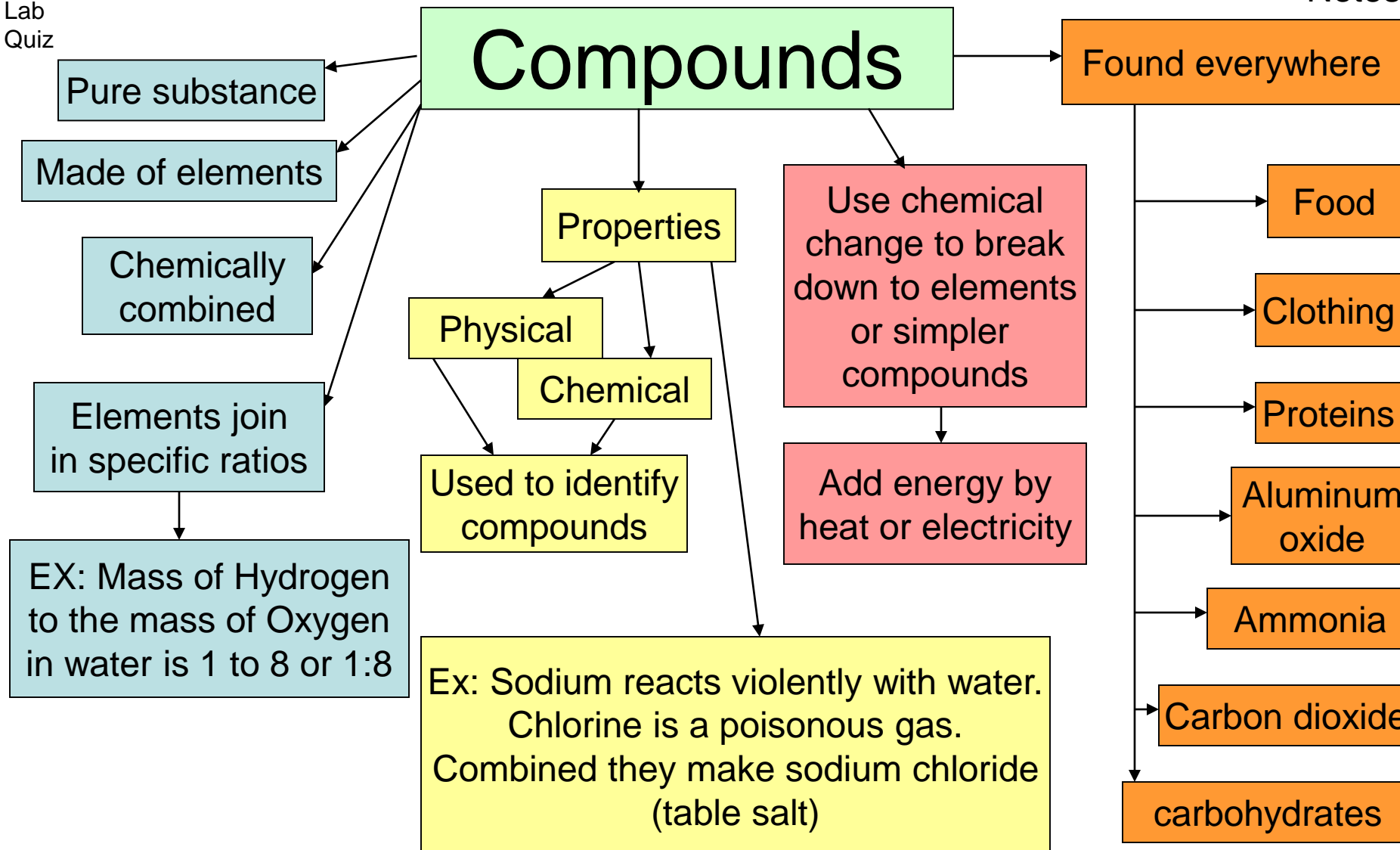
Element – a substance that cannot be separated or broken down into simpler substances by chemical means.

Pure Substance – a sample of matter, either a single element or a single compound, that has definite chemical and physical properties.

Metal – an element that is shiny and that conducts heat and electricity well.

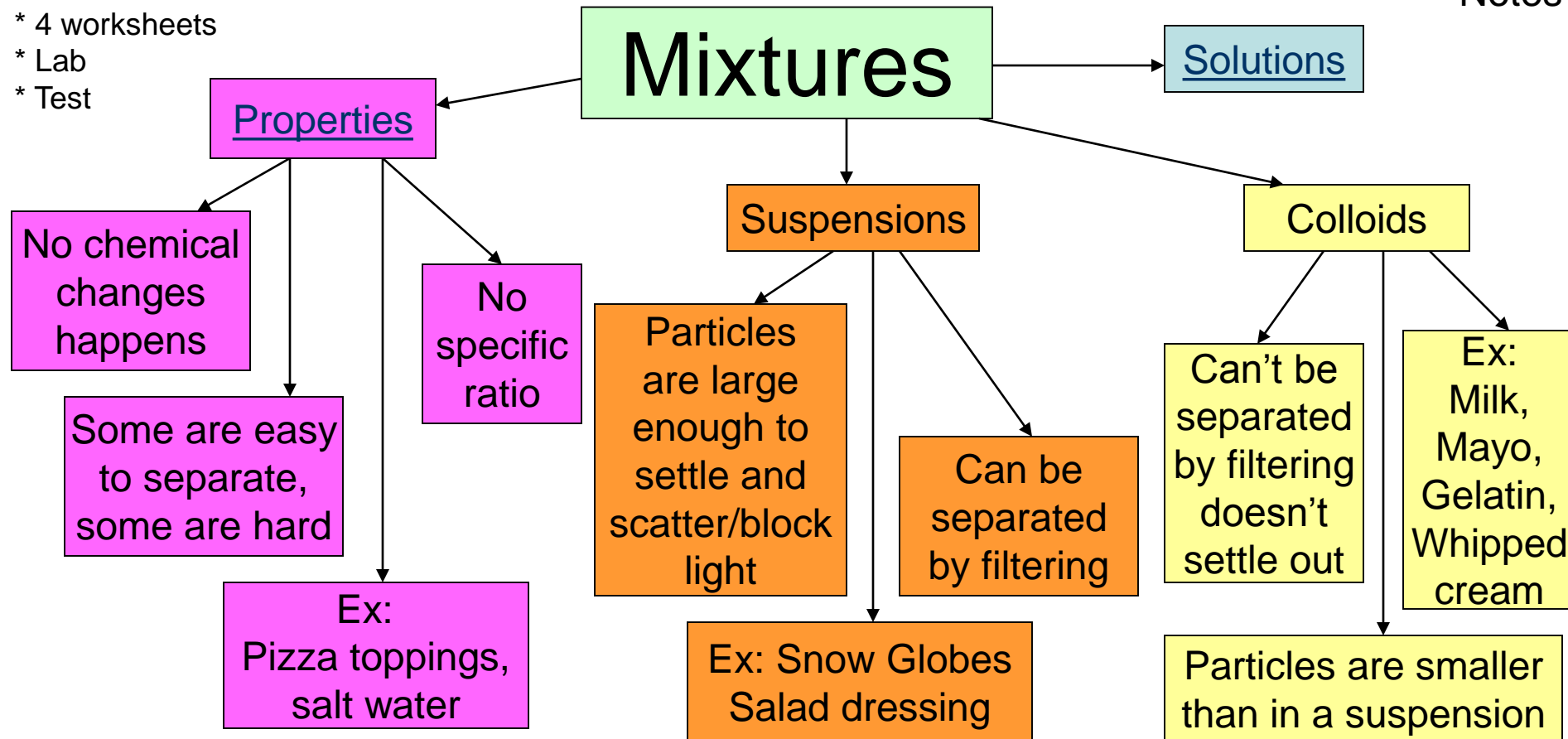
Nonmetal – an element that conducts heat and electricity poorly.

Metalloid – an element that has properties of both metals and nonmetals.



Compound – a substance made up of atoms of two or more different elements joined by chemical bonds.

Familiar Compounds	
Compound	Elements combined
Table Salt	Sodium and Chlorine
Water	Hydrogen and Oxygen
Vinegar	Hydrogen, Carbon, and Oxygen
Carbon Dioxide	Carbon and Oxygen
Baking Soda	Sodium, Hydrogen, Carbon, and Oxygen



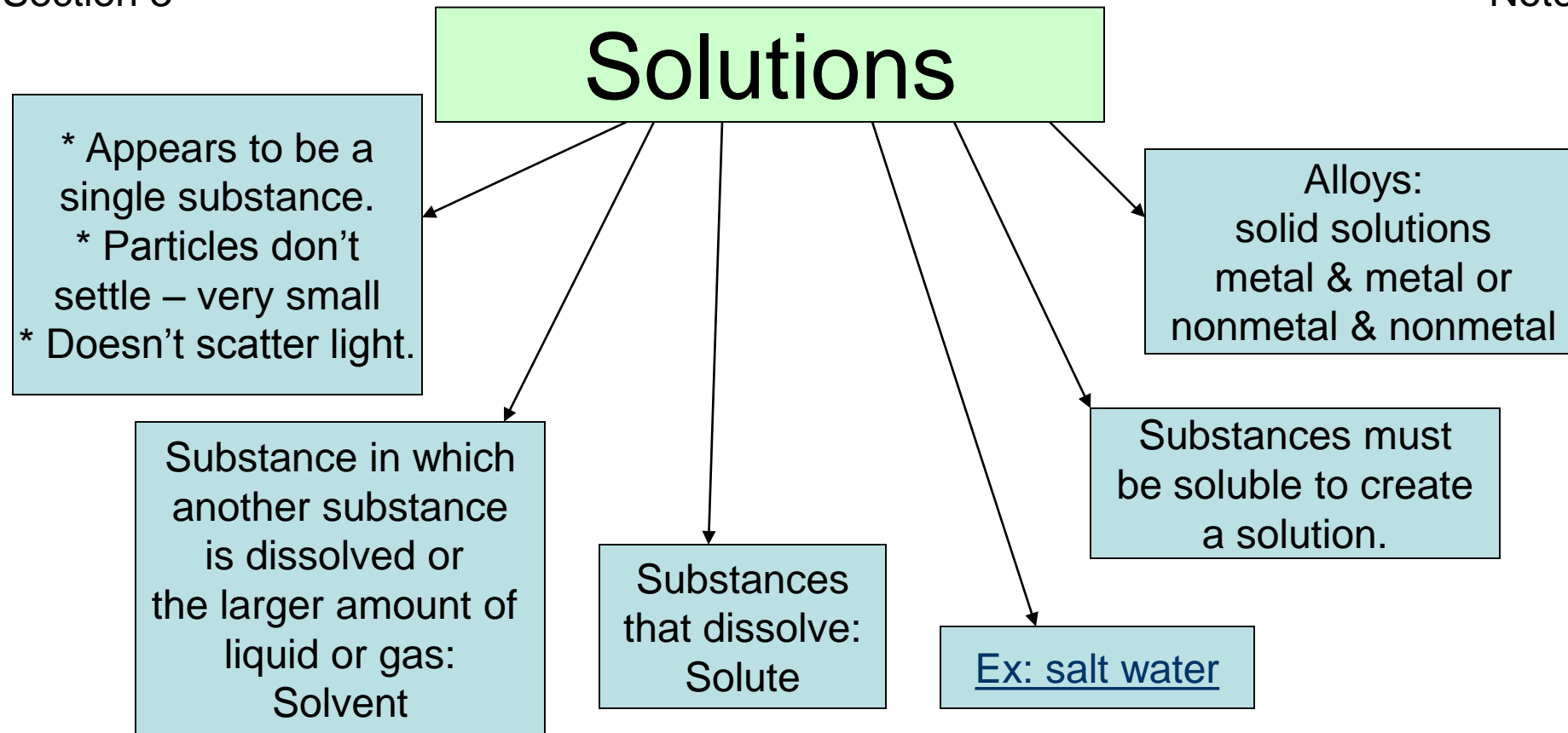
Mixture – a combination of two or more substances that are not chemically combined.

Suspension – a mixture in which particles of a material are more or less evenly dispersed throughout a liquid or gas.

Colloids – a mixture consisting of tiny particles that are intermediate in size between those in solutions and those in suspensions and that are suspended in a liquid, solid or gas.

Mixtures and Compounds	
Mixtures	Compounds
Made of elements, compounds, or both	Made of elements
No change in original properties of components	Change in original properties of components
Separated by physical means	Separated by chemical means
Formed using any ratio of components	Formed using a set ratio of components





Solution – a homogeneous mixture of two or more substances uniformly dispersed throughout a single phase

Solvent – in a solution, the substance in which the solute dissolves.

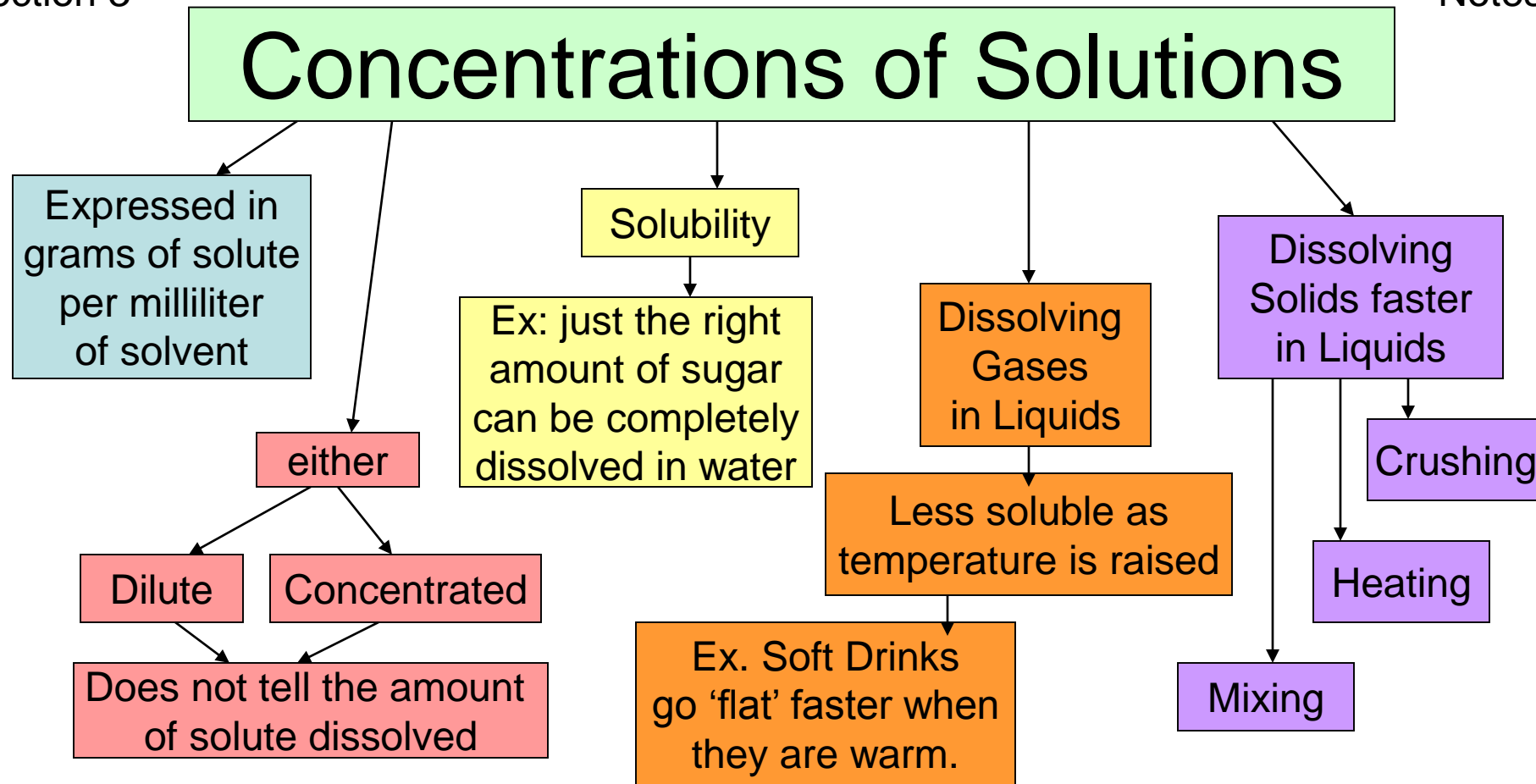
Solute – in a solution, the substance that dissolves in the solvent.

Soluble – able to dissolve

Insoluble – unable to dissolve

Examples of Different States of Solutions	
States	Examples
Gas in gas	Dry air (oxygen in nitrogen)
Gas in liquid	Soft drinks (carbon dioxide in water)
Liquid in liquid	Antifreeze (alcohol in water)
Solid in liquid	Salt water (salt in water)
Solid in solid	Brass (zinc in copper)





Concentration – the amount of a particular substance in a given quantity of a mixture, solution, or ore.

Dilute – a solution with less solute.

Concentrated – a solution with more solute.

Solubility – the ability of one substance to dissolve in another at a given temperature or pressure.

