Mixtures of Compounds & Elements

Classification & Separation

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Types of Mixtures

- Mixtures have variable composition of two or more components.
- A homogeneous mixture is a solution (for example, vinegar: water + acetic acid, or steel & bronze: solid metals)
- A heterogeneous mixture is, to the naked eye, clearly not uniform (for example, a bottle of ranch dressing with two layers: water + oil, or two solids: iron and sulfur)

Separating Mixtures

- ***Filtration:*** *Separation of components in a mixture based upon differences in particle size. Examples: particles from air, coffee from grounds.*
- ***Crystallization:***

Separation based upon differences in solubility of components in a mixture. Example: rock candy

- ***Distillation:***

Separation based upon differences in boiling of components in a homogeneous mixture. Example: gasoline from crude oil

Separating Mixtures

- ***Extraction:*** *Separation based upon differences in a compound's solubility between two different solvents, typically immiscible liquids. Examples: gasoline (hydrocarbons) and water.*
- ***Chromatography:*** *Separation based upon differences a compound's solubility in a solvent versus a stationary phase. Examples: paper chromatography, thin layer (TLC), column, gas -liquid (GC); liquid-liquid: (HPLC), reverse phase.*

QUESTION

Is a cup of coffee a homogeneous solution or a compound? Which of the following agrees with your reasoning?

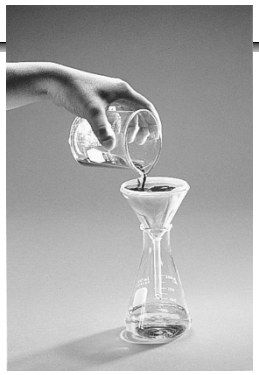
A. The coffee in the cup is a homogeneous solution because it contains the same components throughout, but there are many compounds dissolved to make coffee.
B. The coffee in the cup is a compound because it has a set ratio of components that make it the same throughout.
C. The coffee in the cup is both a compound and a solution.
D. It looks the same throughout like a true solution, yet it always has the same amount of each component.
E. The coffee in the cup is a heterogeneous solution not homogeneous because it contains distinct, different compounds dissolved to make coffee.

Answer

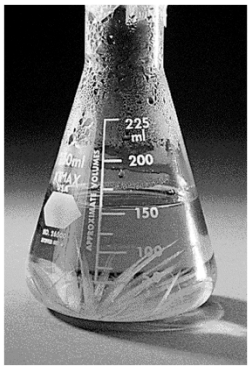
Is a cup of coffee a homogeneous solution or a compound? Which of the following agrees with your reasoning?

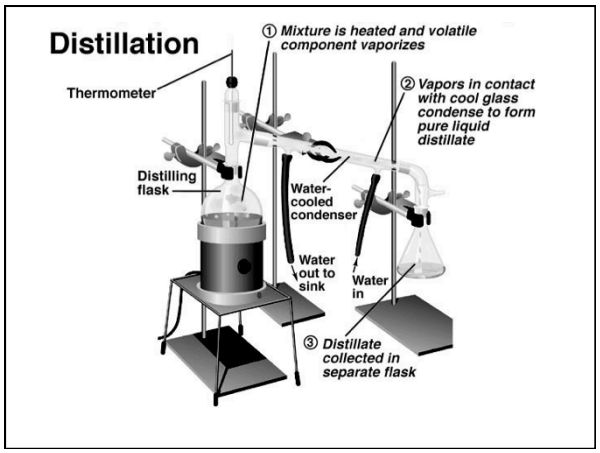
A. The coffee in the cup is a homogeneous solution because it contains the same components throughout, but there are many compounds dissolved to make coffee.
B. The coffee in the cup is a compound because it has a set ratio of components that make it the same throughout.
C. The coffee in the cup is both a compound and a solution.
D. It looks the same throughout like a true solution, yet it always has the same amount of each component.
E. The coffee in the cup is a heterogeneous solution not homogeneous because it contains distinct, different compounds dissolved to make coffee.

Filtration

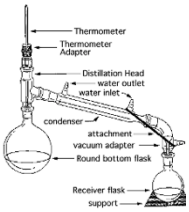


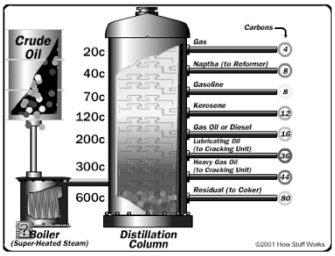
Crystallization



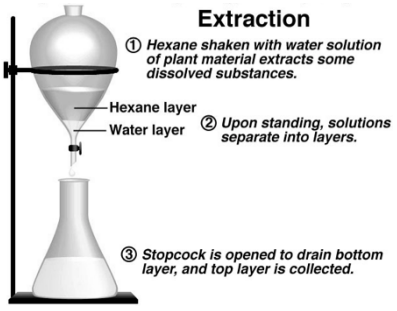


Closer to actual lab apparatus

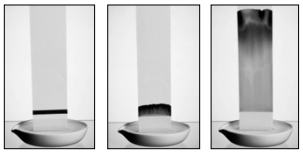




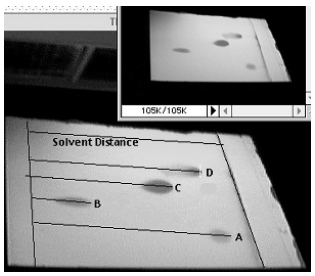
Oil Refining:
http://science.howstuffworks.com/oil-refining4.htm



Paper Chromatography

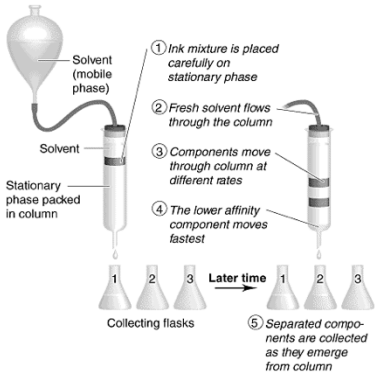


Thin Layer Chromatography



Stationary phase: silica or alumina

Procedure for Column Chromatography



Principle of Gas-Liquid Chromatography