

Name _____ Date _____



SEPARATING MIXTURES QUIZ –Answer Key

1. The following are practical methods of separating mixtures:

Chromatography

Filtration

Distillation

Winnowing

Sedimentation

Separating funnel

Loading

Evaporation

Fractional crystallization

Centrifugation

Crystallization

Magnetic separation

Sublimation

Sieving

Churning

From the above list, what techniques would you apply for the separation of the following?

- Sodium chloride from its solution: **Evaporation**
- Ammonium chloride from a white powder containing sodium chloride and ammonium chloride: **Sublimation**
- Small pieces of metal from the engine oil of a car: **Magnetic Separation**
- Benzene from a mixture of benzene and methylbenzene: **Distillation**
- Different pigments from an extract of flower petals: **Chromatography**

- f. Butter from curd: **Churning**
- g. Oil and water: **Separating funnel**
- h. Tea leaves from tea: **Filtration**
- i. Iron pins from sand: **Magnetic Separation**
- j. Wheat grains from husk: **Winnowing**
- k. Fine mud particles floating in water: **Loading, sedimentation, and filtration**
- l. Dyes: **Chromatography**
- m. Cream from milk: **Centrifugation**
- n. A precipitate from a solution: **Filtration**
- o. Bran from flour: **sieving**
- p. Pulp's solid particles from the vegetable juice: **Filtration**
- q. Blood cells from blood plasma: **Centrifugation**
- r. Iodine from a mixture of sand and iodine: **Sublimation**
- s. Oil from sunflower seeds: **Solvent Extraction**
- t. Nitrate from an aqueous solution of a mixture of potassium nitrate and sodium chloride: **Fractional Crystallization**

2. Why is decantation unsuitable for the separation of insoluble solids from a suspension?

The solids that are lighter than the liquid will keep floating on the surface of the liquid instead of settling down.

3. A mixture contains copper turnings and copper (II) sulfate crystals. Describe how the mixture can be separated.

- **Add distilled water and stir. Copper sulphate dissolves**
- **Filter off copper turnings**
- **Evaporate the filtrate to separate**
- **Leave to cool and form crystals**

4. Chromatography was originally used to separate colored pigments from plants hence its name *chromatography*, which is derived from the Greek word *chromos* meaning color. Can paper chromatography be used to separate colorless substances? Explain.

Yes; the substances can be identified via two methods:

- **Chromatogram may be sprayed with reagents that interact with the separated substances to produce colored spots.**
- **The chromatogram may be exposed to ultraviolet light, which causes various substances to fluoresce making them visible.**

5. Distillation is crucial for separating different components in mixtures. It's widely used in industries to purify water, petroleum refining, recycling of oil, and produce alcoholic beverages among other applications.

- a. State two limitations of fractional distillation as a separation method in chemistry.
- **Less effective when separating components with boiling points that are very close together.**
 - **May not COMPLETELY separate the components of a mixture, causing some overlap or contamination between components.**
 - **Mixtures that undergo chemical reactions during heating may not be effectively separated**

Find more comprehensive explanation here:

<https://chemtribe.com/distillation/>

- b. What's the difference between simple distillation and fractional distillation?
- **Simple distillation is used to separate components with large differences in boiling points (more than 400C).**
 - **Fractional distillation is more efficient than simple distillation and is used to separate components with smaller differences in boiling points (less than 400C), or when higher purity is required.**