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Warm-Up | Separation of Mixtures

Lesson Question

How can mixtures be separated?

Lesson Goals

Understand how mixtures are separated.

Explain why mixtures are able to be separated.

Describe methods of separating mixtures.

Words to Know

Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.

_C_ ore

_A_ filtration

_B_ screening

A. passing a mixture through a layer of sharp-edged particles, such as sand, so that all particles in the mixture of a certain size and consistency will be caught in the filter and separated from the mixture

B. passing a mixture through a screen so that all particles above a certain size are caught and separated from the mixture

C. any mixture of minerals that forms naturally within Earth's crust

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Types of Mixtures

- Mixtures are made of [two] or more pure substances mixed together.
- [Homogeneous] mixtures are [evenly] mixed solutions containing two or more substances.
- [Heterogeneous] mixtures contain substances that are [not] evenly mixed and are not uniform throughout.
  - [Emulsions] and [suspensions] are types of heterogeneous mixtures.

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Slide 2

Screening

Screening is the process of passing a mixture through a screen with holes of uniform size.

This works well for removing larger particles from a mixture.

- Example: using a clothes dryer screen to remove lint

Filtration

Filtration is the process of passing a mixture through layers of different materials.

The process works for smaller particles and soft substances but takes longer .

- Example: using a water filter to remove sediment

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Slide 4

Magnetic Separation

- Very [efficient]
- Can only be used when one part of the mixture is [magnetic]
- Example: separating different types of ore
  - [Ore] is any mixture of [minerals] that forms naturally within Earth's crust.
  - [Iron] is attracted to a magnet so iron can be removed.

7

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

centrifuge	a device that separates mixtures in tubes by spinning them at a high speed so that the acceleration causes denser substances to settle toward the outside of the tube
evaporation	the process of a liquid becoming a gas from a liquid
distillation	a method of separating mixtures in which the mixture is heated until just one substance evaporates, and the pure vapor is collected and condensed
decant	to pour off the top layer

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Slide 7

Separation Using a Centrifuge

- In a centrifuge, a device that separates mixtures in tubes by spinning them at a high speed, denser substances move toward the outer edge of the centrifuge.
  - Solid particles often form a tightly packed pellet at the bottom of their container.
- Once the mixture is separated, the less dense portion can be decanted, or poured off.
- Example: blood sample analysis

Evaporation

Evaporation, the process of a liquid becoming a gas, can be used:

- when a mixture contains a liquid with a lower boiling point than the recovered substance.
- when the application of heat causes some, but not all, of the substances to evaporate.
- when the solution contains a substance that will crystalize out of the solution.
- Example: salt evaporation ponds

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Slide 7

Distillation

Distillation is similar to evaporation but involves extra steps to recover the substance that is evaporated.

- Vapor is collected and condensed, resulting in a pure substance separated from the mixture.
- Distillation works when the substances in the mixture have different boiling points.

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Summary | Separation of Mixtures

Lesson Question

How can mixtures be separated?

Answer

(Sample answer) Heterogeneous mixtures can be separated by screening, filtration, magnetic separation, and using a centrifuge. Homogeneous mixtures can be separated by evaporation and distillation.

Slide 2

Review: Key Concepts

- Processes for separating [heterogeneous] mixtures
  - Screening
  - [Filtration]
  - [Magnetic] separation
  - Centrifuge
- Processes for separating [homogeneous] mixtures
  - [Evaporation]
  - Distillation

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Summary | Separation of Mixtures

Use this space to write any questions or thoughts about this lesson.

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