Separation Techniques

1.) **Hand separation** - mechanical mixtures are often separated by hand, sieve, or magnet.

   - I picked the mushrooms off the pizza.
   - Sieves can be used to separate fossils from sand and gravel.
   - Magnets can separate iron from plastics, aluminum, and copper.

2.) **Filtration** - separation of mechanical mixtures involving liquids and solids.

   - Sand from sand/water mixture.

3.) **Evaporation** - involves allowing the liquid in a solid/liquid solution to evaporate or be boiled off, leaving the solid behind.

   - Evaporating sea water to get salt.

4.) **Distillation** - liquid/liquid solution where the liquids have different boiling points.

5.) **Solvent extraction** - Two types;

   1.) Extraction (removal) of a solid from a mechanical mixture. Use a liquid to dissolve one solid to leave the other behind. You may need to evaporate liquid to get the solid back.

      - Sugar and sand.

   2.) Extraction of a liquid or solid from a liquid solution.

      Miscible - two liquids are miscible if both will dissolve into each other wholly.

      - Alcohol and water.

      Immiscible - when two liquids will NOT dissolve wholly into each other.

      - Vegetable oil and water.
Add a new solvent (solvent$^2$) where solvent$^2$ is immiscible with the solvent and solvent$^2$ must dissolve the wanted substance and leave behind the other substances. Then use a separatory funnel (sep funnel).

6.) Recrystallization - used when a solid consists of the desired material and small amounts of impurities. Use a saturated (liquid has dissolved all the solid it can) solution and allow some solvent to evaporate, the crystals of the solid will form and be extremely pure. Recrystallization Video

7.) Gravity separation - separates mechanical mixtures based on densities.

Ex.
- Gold panning is when dense gold settles to the pan bottom and the rest is poured off.
- Centrifuge spins a test tube at high speed and forces dense solids to the bottom.

8.) Paper, column and thin layer chromatography - separates components of a mixture based on different affinities for the stationary phase.
Practice - Worksheet - Separation Techniques

Practice - Lab - Separation Using Paper Chromatography  Separation Using Paper Chromatography - KEY

Handout - Separation Techniques Summary

Practice - Quiz - Phases, Classification and Separation  Phases, Classification and Separation - KEY

Review - Worksheet - The Physical Properties and Physical Changes of Substances  The Physical Properties and Physical Changes of Substances - Answers

Review - Crossword Puzzle - Unit 1 Review  Unit 1 Review - Answers

Test - Classification and Techniques