

Distillation Worksheet

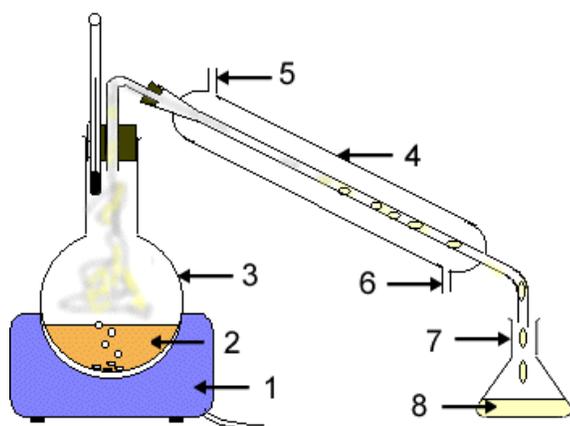
What is Distillation?

_____ is a physical process used to separate a solvent from a solute based upon differences in boiling point.

The process of distillation involves the **e**_____ and **c**_____ of a liquid.

For example, in sea water there is a large difference between the _____ points of the dissolved salts (**solute / solvent**) and the water (**solute / solvent**). Pure water can be obtained from sea water by the process of distillation. The sea water is evaporated leaving the salt behind and the _____ is recovered by condensation.

Chemical Distillation apparatus



1. Electric _____ mantle
2. M_____ (solute and solvent)
3. H_____ vessel
4. Liebig _____
5. Water _____
6. Water _____
7. _____ flask
8. _____

The steps in the process of distillation

- The mixture is heated.(1-2)
- The ingredient with the lowest boiling point evaporates. (3)
- The hot vapor travels through the Liebig condenser where it is condenses.(4)
- Continually running water through the condenser keeps it cool. (5 water outlet and 6 water inlet)
- The distillate is then collected.(7-8)

Questions about distillation

1. Distillation is used to separate mixtures on the basis of what physical property?
2. Where does evaporation take place?
3. Where does condensation take place?
4. What is the liquid that leaves the condenser called?
5. Why are glass beads added to the heating vessel?
6. Why is it best to have the water inlet at point 6 rather than point 5?
7. What are some risks associated with the process of distillation?
8. How can these risks be minimized?

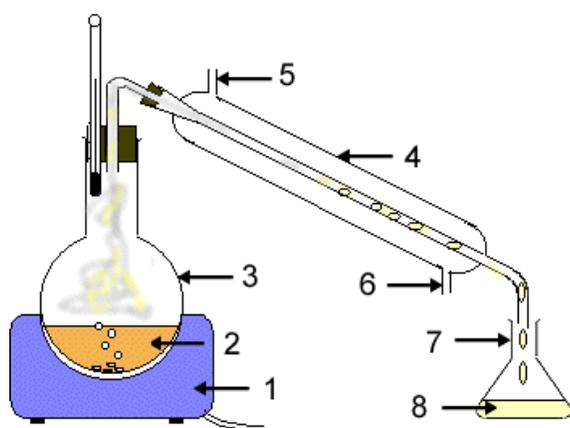
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The process of distillation involves the **evaporation** and **condensation** of a liquid.

For example, in sea water there is a large difference between the **boiling** points of the dissolved salts (**solute / solvent**) and the water (**solute / solvent**). Pure water can be obtained from sea water by the process of distillation. The sea water is evaporated leaving the salt behind and the **water** is recovered by condensation.

Chemical Distillation apparatus



1. Electric **heating** mantle
2. **Mixture** (solute and solvent)
3. **Heating** vessel
4. Liebig **condenser**
5. Water **outlet**
6. Water **inlet**
7. **Conical** flask
8. **Distillate**

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Distillation Questions and Sample Answers

1. Distillation is used to separate mixtures on the basis of what physical property?

Distillation separates substances on the basis of differences in boiling point

2. Where does evaporation take place?

Evaporation takes place in the heating vessel

3. Where does condensation take place?

Condensation takes place in the Liebig condenser

4. What is the liquid that leaves the condenser called?

*The liquid that leaves the condenser is called the **distillate***

5. Why are glass beads added to the heating vessel?

*Glass beads **prevents bumping**, the formation of superheated bubbles which may explode violently.*

6. Why is it best to have the water inlet at point 6 rather than point 5?

*Water entering at the bottom of the condenser ensures that there are **no trapped air bubbles** in the tube which would **reduce the efficiency of the condenser**.*

7. What are some risks associated with the process of distillation?

i) The glass is hot and may cause burns to the skin if touched.

ii) Hot gas may escape from the joints and cause burns.

8. How can these risks be minimized?

i) Don't touch the glass during distillation.

ii) Make sure that the joints are lubricated to prevent hot gases from escaping.