

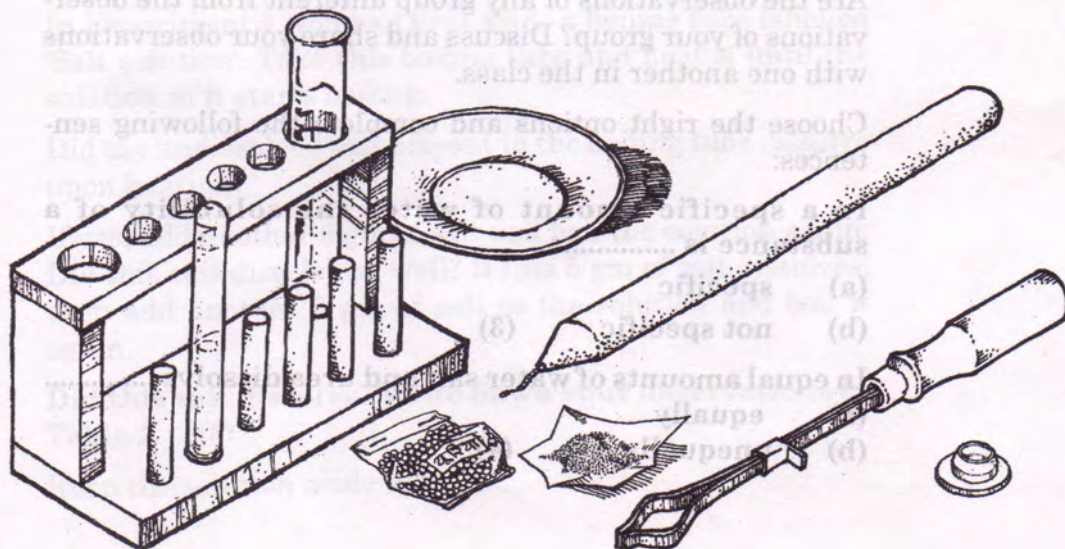
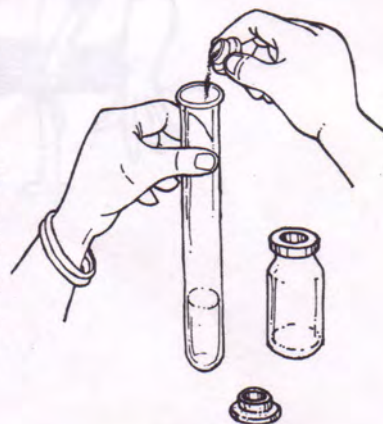
# SOLUBILITY

In the chapter on 'Separation' we had seen that some substances are soluble in water while others are insoluble. There are also some substances that are insoluble in cold water, but dissolve in hot water.

In this chapter we shall perform some more experiments on solubility.

For these experiments, we will require measured quantities of water as well as salt and urea.

You may have seen the rubber stopper of an injection bottle. If you place this stopper upside down you will notice that it has a pit. If this pit is filled with salt or urea and levelled with a finger, the quantity of the substance it contains is about half a gram. Measured twice in this manner, you will get 1 gm of salt or urea. In the following experiments, wher-



ever you are asked to take 1 gm of a substance, you should use this method for measuring the substance.

## SOLUBILITY IN COLD WATER

### EXPERIMENT 1

Fill a boiling tube one-fourth with water. Dissolve 1 gm of salt in it.

Did the salt dissolve? If yes, then add one more gram of salt to the boiling tube.

Did this dissolve too? Keep repeating this process till the salt stops dissolving.

Label this boiling tube as 'Salt solution' and keep it aside.

**After adding how many grams did the salt stop dissolving in water? Write the quantity in Table 1. (1)**

Take another boiling tube, fill it one-fourth with water and repeat the same experiment, now using urea.

**After how many grams did the urea stop dissolving? Write the quantity in Table 1. (2)**

Label this boiling tube as 'Urea solution' and keep it aside.

**TABLE 1**

Name of substance	Maximum amount dissolved in cold water
Salt	
Urea	

Are the observations of any group different from the observations of your group? Discuss and share your observations with one another in the class.

Choose the right options and complete the following sentences:

**In a specific amount of water the solubility of a substance is .....**

- (a) specific  
(b) not specific (3)

**In equal amounts of water salt and urea dissolve .....**

- (a) equally  
(b) unequally (4)

The solubility of different substances in water is .....

- (a) the same
- (b) different (5)

### EFFECT OF HEAT ON SOLUBILITY

#### EXPERIMENT 2



In this experiment we will try to find out what effect heat has on the solubility of different substances. We will particularly investigate whether the effect of heat on the solubility of salt and urea is the same or different.

In Experiment 1, you had kept aside a boiling tube labelled 'Salt solution'. Take this boiling tube and heat it until the solution in it starts boiling.

Did the undissolved salt present in the boiling tube dissolve upon heating?

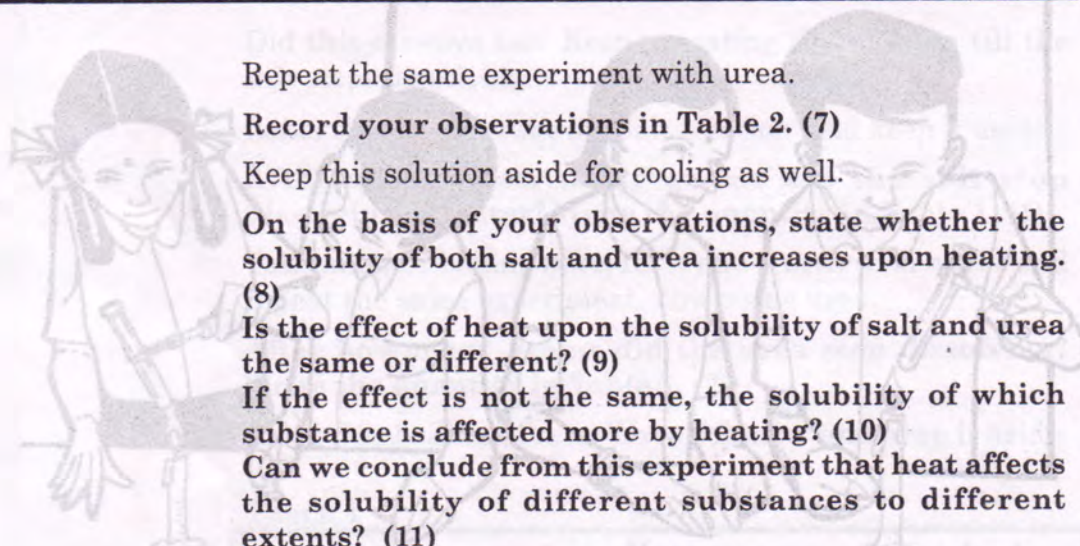
If yes, add another 5 gm of salt and boil the solution again. Did this salt dissolve as well? If this 5 gm of salt dissolves, then add another 5 gm of salt to the solution and boil it again.

**Did this salt dissolve? Write down your observations in Table 2. (6)**

Keep the solution aside to cool.

TABLE 2

Substance	Effect of heating		
	Did the undissolved substance present in the cold solution dissolve	Did the first 5 gm dissolve?	Did the second 5 gm dissolve?
Salt			
Urea			



Repeat the same experiment with urea.

Record your observations in Table 2. (7)

Keep this solution aside for cooling as well.

On the basis of your observations, state whether the solubility of both salt and urea increases upon heating. (8)

Is the effect of heat upon the solubility of salt and urea the same or different? (9)

If the effect is not the same, the solubility of which substance is affected more by heating? (10)

Can we conclude from this experiment that heat affects the solubility of different substances to different extents? (11)

Observe both the solutions after they have cooled.

Do you see any difference in the two solutions? Describe in your own words. (12)

Can you give any reason for this difference? (13)

You have seen that if more than a certain quantity of a substance is added to water, it remains undissolved. What will you do if you wish this remaining substance to dissolve?

Until now we have experimented with the solubility of various substance in water. There are substances which are insoluble in water but dissolve in some other liquid. For example, if cloth becomes stained with grease, we clean it with kerosene. This is possible because grease is soluble in kerosene.

### LIQUID IN LIQUID

#### EXPERIMENT 3

Until now we have only talked about the solubility of solid substances like urea and salt. Two liquids, too, can be soluble in each other or they can be insoluble in each other.

Have you ever tried mixing kerosene and water?

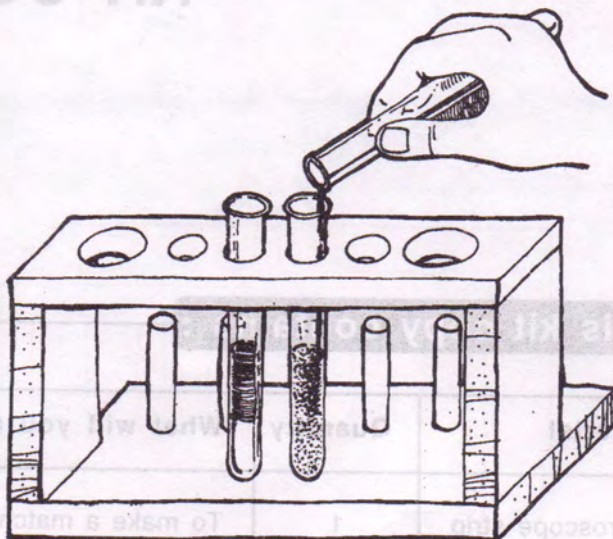
Are water and kerosene soluble in each other? (14)

Let us do a simple experiment to find out.

Fill two test-tubes about one-third with kerosene. Pour about one-third test-tube of coconut oil into one of them. What happened?

Pour about one-third test-tube of water into the other test-tube. What happened?

What is the difference between the solubility of coconut oil and water in kerosene? (15)



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### NEW WORDS

soluble   insoluble   undissolved