

LESSON | How can mixtures be 13 | separated?

When you separate a mixture, you just separate the parts. You do not separate the linked-up atoms. Mixtures are separated without any chemical reaction.

There are many different kinds of mixtures. Different mixtures are separated in different ways. There are four main ways to separate a mixture. They are:

STRAINING Straining separates matter by size. A strainer has holes. Any matter that is smaller than the holes passes through the holes. Anything larger than the holes stays in the strainer. Strainers come in different sizes—some have large holes, some have small holes.

Filter paper is a kind of strainer. Filter paper has very tiny holes. It separates tiny pieces of solids from the liquids they are mixed with.

USING A MAGNET A magnet separates iron parts from a mixture.

EVAPORATION When some substances mix with water, they seem to disappear. Think of sugar and water. In water, sugar seems to disappear. The sugar **dissolves**. Solids can be dissolved in other liquids as well. However, not all solids can be dissolved. Think of sand in water. Does sand dissolve in water?

Sugar and water form a mixture, not a compound. The sugar molecules do not change. You can taste the sugar even though you cannot see it. If you let the water evaporate, the sugar will remain. The sugar will not evaporate. Mixtures like sugar and water can be separated using evaporation. A liquid will **evaporate** [i-VAP-uh-rayt] faster if you heat it.

DISSOLVING Dissolving is sometimes helpful when you want to separate a mixture. Think of a mixture of sugar and sand. If you put this mixture in water, the sugar will dissolve. The sand will not dissolve. Now you can filter out the sand from the water. Then, you can evaporate the water leaving the sugar behind.

WHAT DO THE PICTURES SHOW?

Five of the pictures below show a mixture being separated. The other picture shows a step needed before separation can be done.

Look at each picture. Then answer the questions on the next page. Write the letter of the right picture for each question.

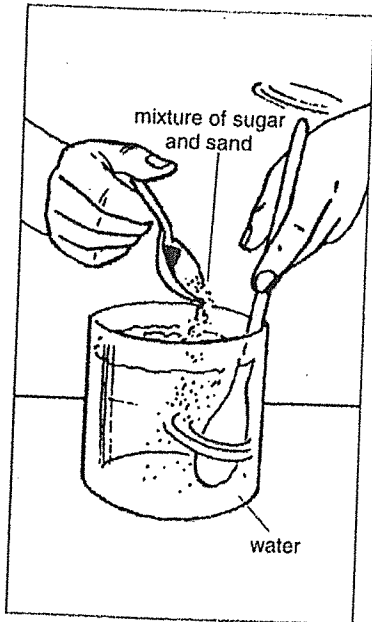


Figure A

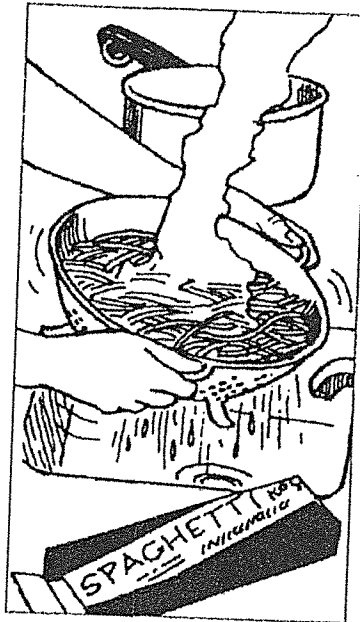


Figure B

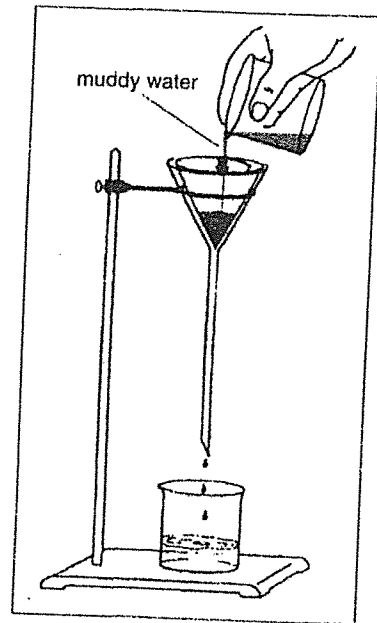


Figure C

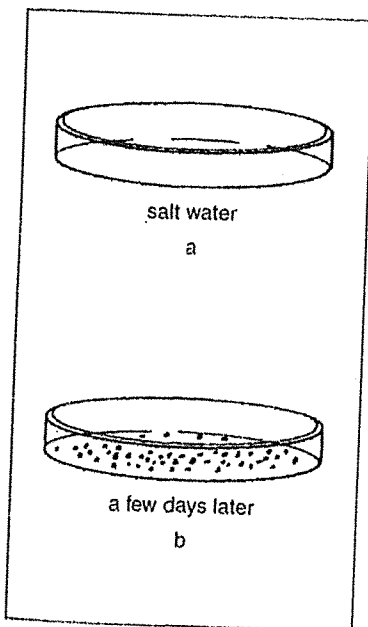


Figure D

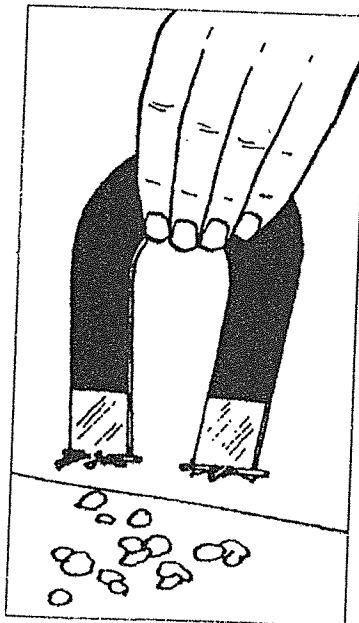


Figure E

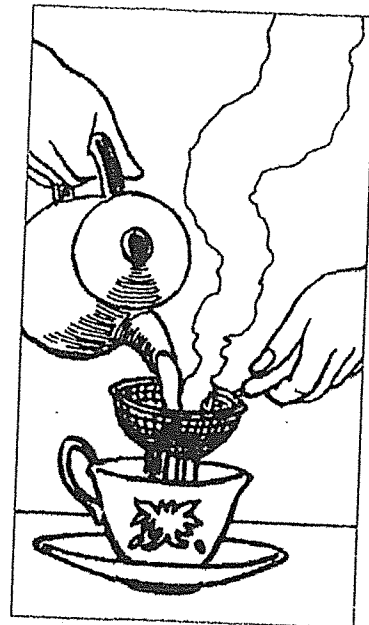


Figure F

1. Which pictures show straining? _____
2. Which picture shows filter paper being used? _____
3. Which picture shows pieces of iron being separated? _____
4. Which pictures show dissolving? _____
5. Which picture shows evaporation? _____

FILL IN THE BLANK

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some words may be used more than once.

mixture
air
dissolving
evaporation
heated

straining
size
dissolve
filter paper

iron
using a magnet
strainer
holes

1. Four ways to separate mixtures are: _____, _____, _____, and _____.
2. Straining separates matter according to _____.
3. A _____ separates matter by size.
4. A strainer has many _____.
5. We can separate a mixture of very tiny solid pieces and water by using _____.
6. We use a magnet to separate _____ from a mixture.
7. When water evaporates, the vapor escapes into the _____.
8. A solid that seems to disappear in a liquid is said to _____.
9. Sugar and water are a _____.
10. A liquid will evaporate faster if it is _____.

WORD SCRAMBLE

Below are several scrambled words you have used in this Lesson. Unscramble the words and write your answers in the spaces provided.

1. VISOLED S _____

2. AVOPEATER _____

3. TIREXUM _____

4. MONDOCUP _____

5. TAGMEN _____

TRUE OR FALSE

In the space provided, write "true" if the sentence is true. Write "false" if the sentence is false.

_____ 1. Straining causes a chemical change.

_____ 2. Evaporation causes a chemical change.

_____ 3. A magnet causes a physical change.

_____ 4. Dissolving causes a physical change.

_____ 5. Filter paper has large holes.

_____ 6. Only scientists use strainers.

_____ 7. When a liquid evaporates, its molecules go into the air.

_____ 8. Sugar dissolved in water is still sugar.

_____ 9. A magnet can separate a mixture of paper clips and rubber bands.

_____ 10. Hot water evaporates faster than cold water.

HOW WOULD YOU SEPARATE THESE MIXTURES?

Five kinds of mixtures are listed below. Can you decide how to separate these mixtures? Before making up your mind, study the diagrams. Each diagram shows a different step used in separating mixtures.

- Mixture 1 salt and iron filings
- Mixture 2 salty water
- Mixture 3 salt, iron filings, and water
- Mixture 4 gravel, sand, and sugar
- Mixture 5 gravel, sand, sugar, and iron filings

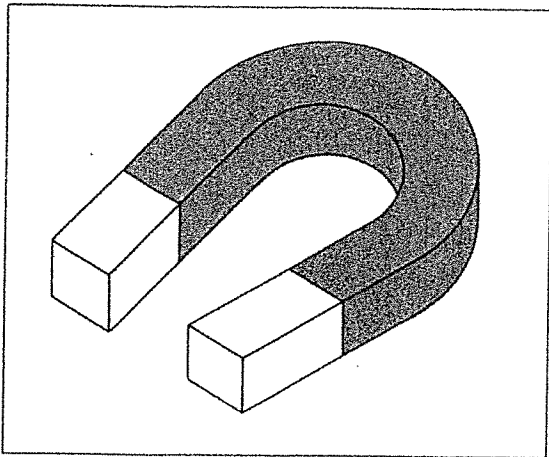


Figure N A magnet is used to separate iron.

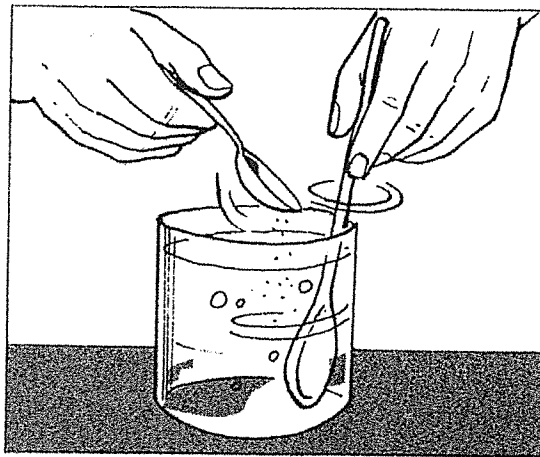


Figure O Water is used to dissolve a solid.

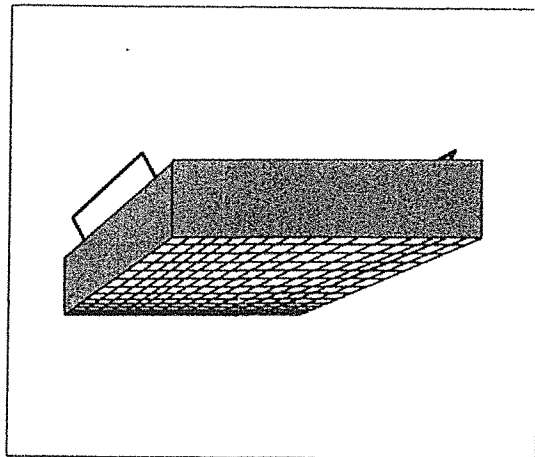


Figure P A strainer is used to separate large solids.

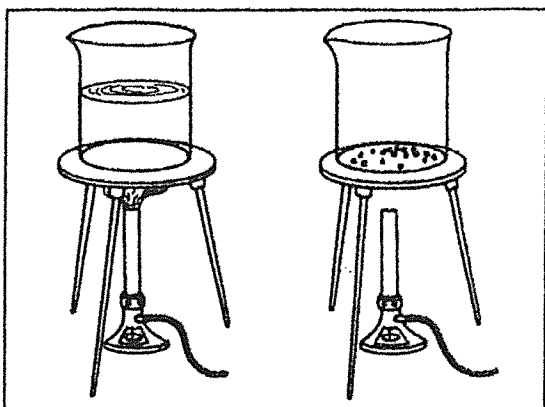


Figure Q Evaporation is used to separate already dissolved solids.

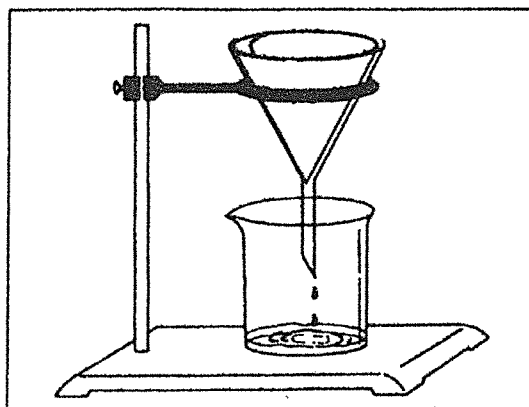


Figure R Filtration is used to separate very small solids.

Now decide which step or steps are needed to separate mixtures 1 through 5. In the blank spaces below, write down the steps you would use. In most cases, the order in which the steps are taken is not important.

Mixture 1: salt and iron filings (only one step is needed)

Step 1: _____

Mixture 2: salt water (only one step is needed)

Step 1: _____

Mixture 3: salt, iron filings, and water (two steps are needed)

Step 1: _____

Step 2: _____

Mixture 4: gravel, sand, and sugar (four steps are needed)

Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Mixture 5: gravel, sand, sugar, and iron filings (five steps are needed)

Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____