

AIM | How can we separate 17 | mixtures?

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: by *straining*, by using a magnet, by *evaporation*, and by *dissolving*.

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.

MAGNET: A magnet separates iron parts from a mixture.

EVAPORATION: In some mixtures, a solid is dissolved in a liquid. Think of sugar and water. In water, sugar seems to disappear. The sugar dissolves. Not all solids dissolve in liquid. Think of sand in water. Does sand dissolve in water?

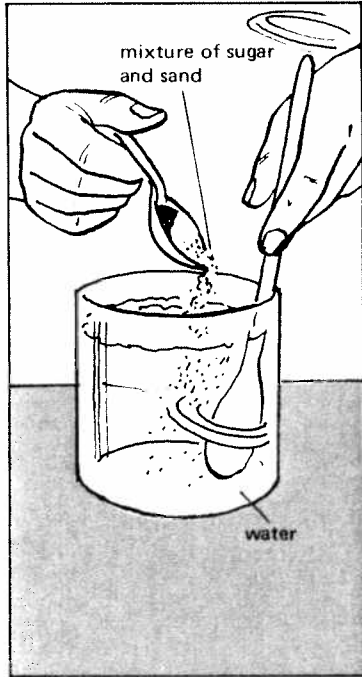
If the liquid evaporates, the solid will appear. The solid will not evaporate. The liquid will evaporate faster with heat.

DISSOLVING: Some mixtures must be dissolved before they can be separated. Water or another liquid is added.

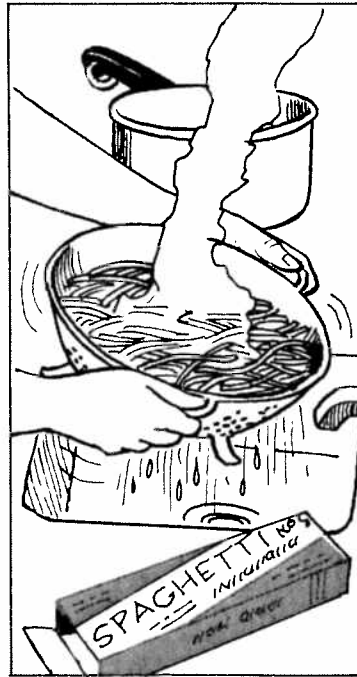
WHAT DO THE PICTURES SHOW?

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

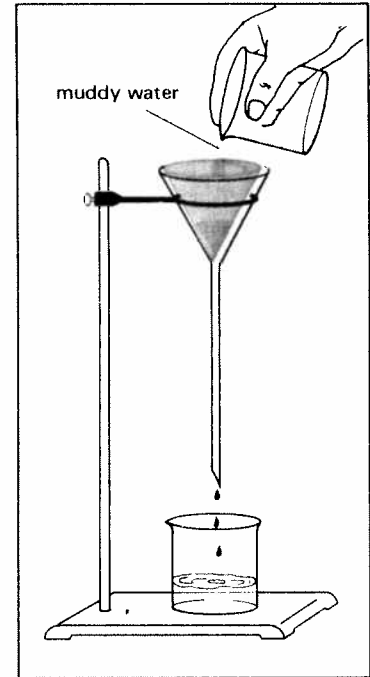
Look at each picture. Then answer the questions on the next page. Write the letter of the right picture for each question.



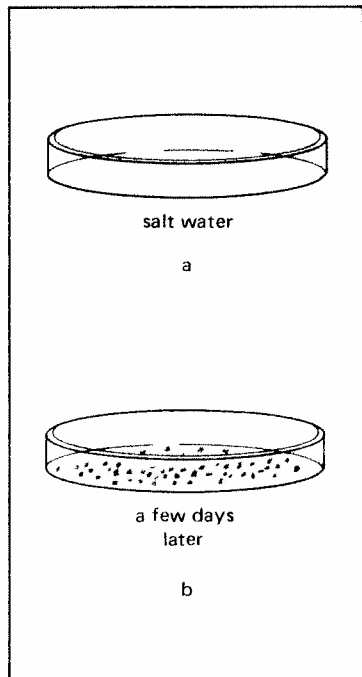
A.



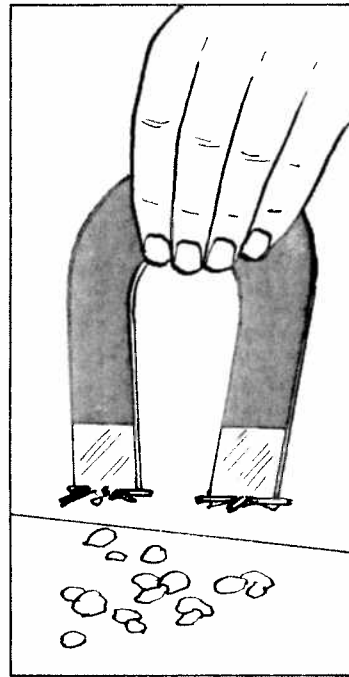
B.



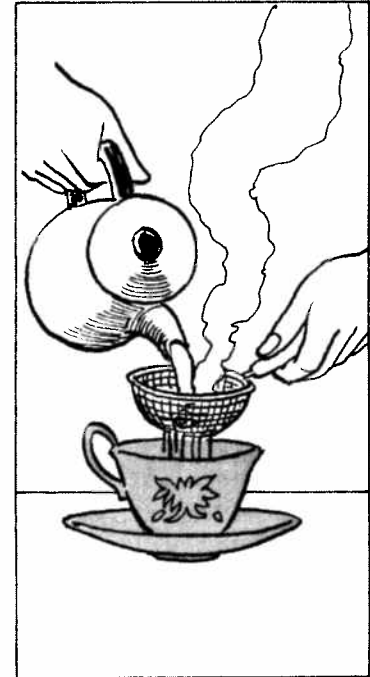
C.



D.



E.



F.

1. a) Which pictures show straining? _____
 b) Which picture shows filter paper being used? _____
2. a) Which picture shows pieces of iron being separated? _____
 b) What is being used to separate the iron? _____
3. Which picture shows dissolving? _____
4. Which picture shows evaporation? _____

COMPLETING SENTENCES Complete the sentences with the choices below.

water
 air
 dissolving
 evaporating
 heat

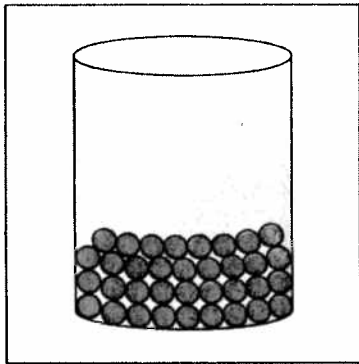
straining
 size
 dissolve
 filter paper

iron
 using a magnet
 strainer
 holes

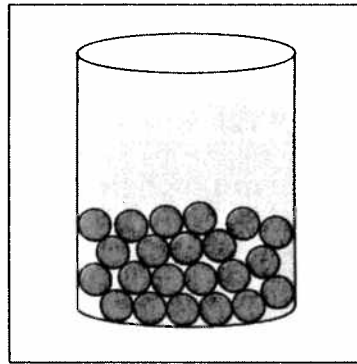
1. Four ways to separate mixtures are: _____, _____, _____, and _____.
2. Straining separates matter according to _____.
3. A _____ separates matter by size.
4. A strainer has many _____.
5. We can separate a mixture of very tiny solid pieces and water by using _____.
6. We use a magnet to separate _____ 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. The liquid that dissolves more solids than any other liquid is _____.
10. A liquid will evaporate faster with _____.

MATCHING PIECES AND STRAINERS

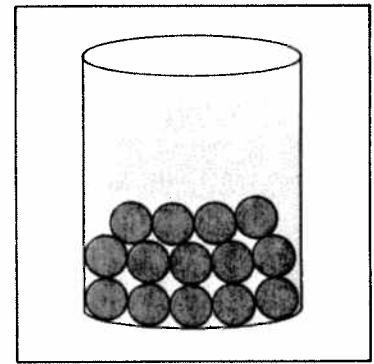
Each of these glasses holds water and solid pieces.



A

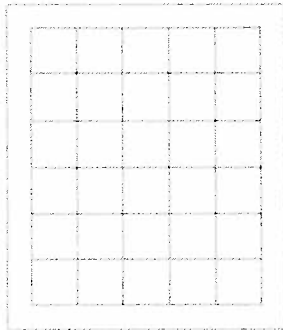


B

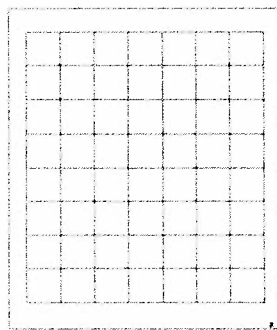


C

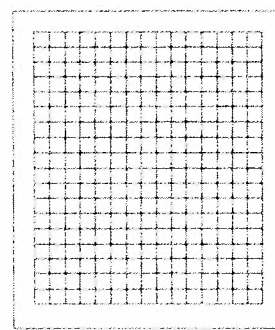
Each of these is a screen strainer.



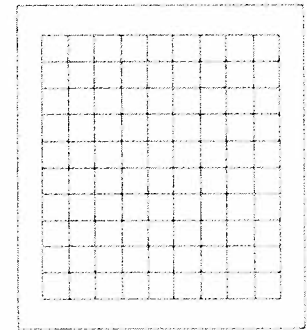
1



2



3



4

How To Do This

1. Use your metric ruler to measure *one* of the solid pieces in each of the glasses.
2. Measure the width of *one* of the openings in each screen strainer.
3. Choosing from the list below, write on the provided lines the measurements of each solid piece and screen opening.

2 mm

3.5 mm

4.5 mm

6 mm

3 mm

4 mm

5 mm

The solid pieces in glass A measure _____ across.

The solid pieces in glass B measure _____ across.

The solid pieces in glass C measure _____ across.

The openings in screen 1 measure _____ across.

The openings in screen 2 measure _____ across.

The openings in screen 3 measure _____ across.

The openings in screen 4 measure _____ across.

Now, use these measurements to answer the following questions. Choose the number of the right strainer for questions 1-4.

1. Which strainer will separate all the shown solids from the water? _____
2. Which strainer will separate none of the shown solids from the water? _____
3. Which is the largest strainer that can separate the solids in glass B? _____
4. Which is the largest strainer that can separate the solids in glass A? _____
5. Can any of these strainers separate salt from salt water? _____

TRUE OR FALSE Write T on the line next to the number if the sentence is true.
Write F 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, it goes into the air.
8. _____ When sugar dissolves it goes out of the water.
9. _____ A magnet can separate a mixture of paper clips and rubber bands.
10. _____ Hot water evaporates faster than cold water.

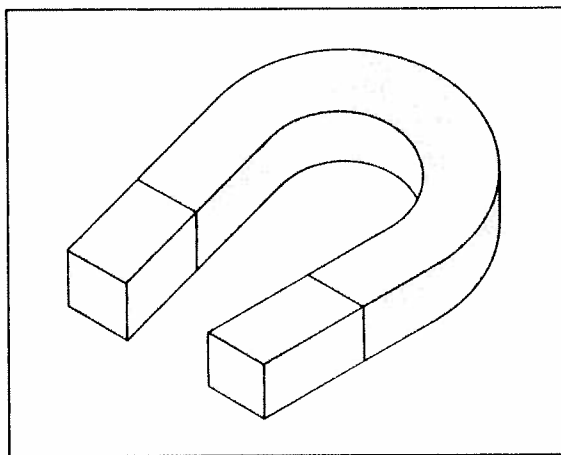
HOW WOULD YOU SEPARATE THESE MIXTURES?

Five kinds of mixtures are listed below.

- 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

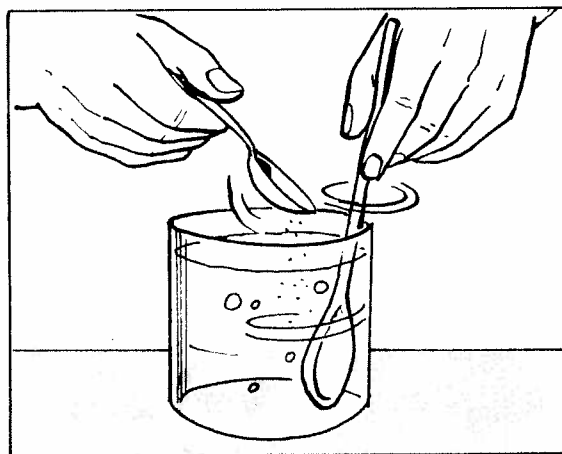
Can you decide how to separate these mixtures? Before making up your mind, study the diagrams. Each diagram shows a different step used in separating mixtures.

Diagram A



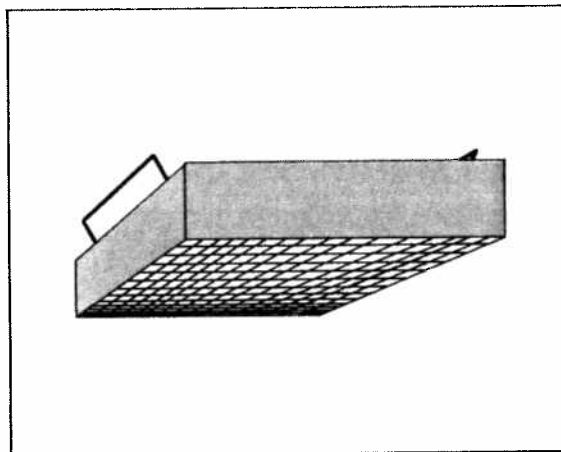
A magnet is used to separate iron.

Diagram B



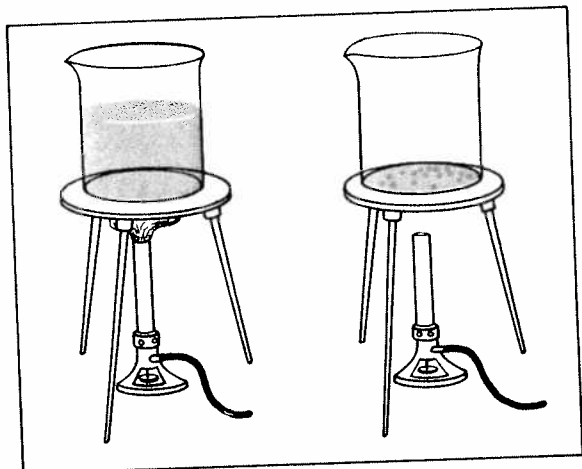
Water is used to dissolve a solid.

Diagram C



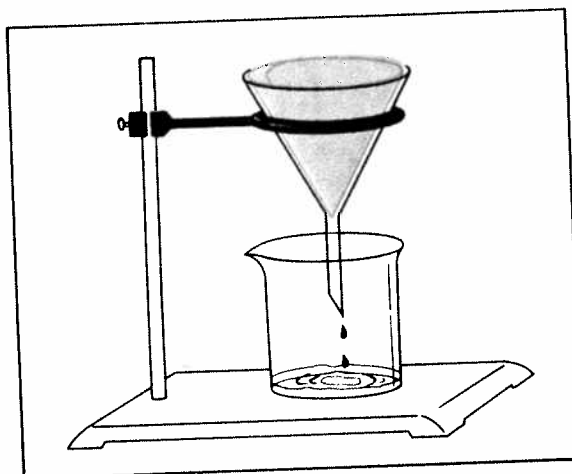
A strainer is used to separate large solids.

Diagram D



Evaporation is used to separate already dissolved solids.

Diagram E



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 the *diagram* letters (A, B, C, D, or E) of the steps you would use.

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

Mixture 2. salty water (only one step is needed) _____

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

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

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