THE STRIVING

MUSLIM ACADEMY

Islamic and Academic Education

YEARS 7 TO 9 · SCIENCE

Pure and impure substances

What pure means in chemistry, mixtures you can see the parts of and mixtures you cannot, and separating them.

WHAT IS INSIDE

- Pure, and what the word means here
- Mixtures that look the same, and mixtures that do not
- Separating a mixture, which you do rather than read
- Pure substances, mixtures and separating them
- How each one is answered

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1 sets · a hint on every question

Written for a parent teaching at home. No training assumed, and nothing else to buy.

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Mixtures that look the same, and mixtures that do not

Read this, then answer the questions on it.



MIXTURES THAT LOOK THE SAME, AND MIXTURES THAT DO NOT

A mixture can be classified by whether it looks uniform throughout.

A homogeneous mixture has the same composition everywhere, so you cannot see the parts: salt dissolved in water, or air. A heterogeneous mixture does not, so you can: sand in water, or a fruit cake.

The distinction matters for separating them. Some heterogeneous mixtures can be filtered, because the parts are physically separate and differ in size: sand from water. Not all of them can, since oil and vinegar separate on standing but no paper filter divides them. A homogeneous mixture cannot be filtered at all, because at the scale of the filter there is nothing separate to catch.

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Separating a mixture, which you do rather than read

Read this, then answer the questions on it.



SEPARATING A MIXTURE, WHICH YOU DO RATHER THAN READ

A mixture can be separated by physical changes, such as evaporation. A compound is broken down by chemical changes instead, and many compounds break down when heated.

Run each method below and record what happened, rather than reading a description, rather than describing them. Each one below needs nothing you do not have in a kitchen.

Stir sand into water and pour it through a paper coffee filter. Write down what stayed on the paper and what went through. Then stir salt into water and pour that through the same kind of filter, and write down what happened instead. Then leave the salt water in a warm place until the water has gone, and write down what is left in the dish.

Three runs, three results, and between them they tell you what a filter can and cannot do and what evaporation recovers. Work out the rule from your own three results rather than being given it.

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How each one is answered

Mark it together. Where a question asks for a list, the order does not matter.



PURE SUBSTANCES, MIXTURES AND SEPARATING THEM

1. Give the two broad categories matter falls into.

1. Matter falls into mixtures and pure substances.

Answer: **mixtures and pure substances**

2. What does a pure substance have, according to the source, and what is true of all its specimens?

1. A pure substance has a constant composition.
2. All specimens of it have exactly the same makeup and properties.

Answer: **a constant composition, and all specimens have exactly the same makeup and properties**

3. A sports drink is a homogeneous mixture whose composition can vary. Explain why that rules it out as a pure substance.

1. A pure substance has a constant composition, and all specimens of it have exactly the same makeup and properties.
2. A sports drink's composition can vary.
3. So it cannot be a pure substance, however clean or wholesome it is.

Answer: **because its composition can vary, and a pure substance's cannot**

4. Give the difference between a homogeneous and a heterogeneous mixture, with an example of each.

1. Homogeneous: the same composition throughout, so the parts cannot be seen. Salt water, or air.
2. Heterogeneous: not uniform, so the parts can be seen. Sand in water, or a fruit cake.

Answer: **homogeneous is uniform with the parts invisible, such as salt water; heterogeneous is not, such as sand in water**

5. Do the three runs in the panel, then write the rule: what does a filter separate, and what does it not?

1. In run one the sand stayed on the paper and the water went through.
2. In run two nothing stayed on the paper: the salt went through with the water.
3. In run three the water left and the salt stayed in the dish.
4. So a filter separates something that has not dissolved, and does nothing to something that has. What has dissolved is recovered by letting the liquid go instead.

Answer: **the pupil's own rule, drawn from their three results: a filter catches what has not dissolved, and evaporation recovers what has**

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SAMPLE PAGES

You have read a few pages. The pack is longer.

What you are holding is a short sample, taken from different parts of the pack so that you can see how a week is planned and what a child is actually asked to do, before you decide.

The complete pack, and the rest of the academic materials, are on our website: schemes of work for a parent teaching at home, and practice packs for the skills children get stuck on.

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Our Islamic Education classes are free. These packs are part of what pays the teachers who teach them.