

Pure Substances and Mixtures

KS3 Chemistry · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

A carton says '100% pure orange juice'. Is it pure in the chemical sense?

Step 1 · Chemical meaning of pure

A pure substance contains only one element or one compound.

Step 2 · What is in juice?

Water, sugars, citric acid, vitamin C and many other substances.

Answer: No — it is a mixture (nothing has been added, but it contains many substances)

Check: 'Pure' on a label means 'nothing added', not 'one substance'.

2. Now try one with the steps

Is oxygen gas a pure substance? Is air?

Step 1 · Oxygen

Step 2 · Air

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is a pure substance, in chemistry? [1]

2. What is a mixture? [1]

3. Is distilled water pure or a mixture? [1]

4. Is tap water pure or a mixture? [1]

5. At what temperature does pure water boil at sea level, in °C? [1]
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6. What does 'pure' usually mean on a food label? [1]
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7. How does a pure substance melt, compared with an impure one? [2]
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8. Do impurities raise or lower the melting point of a substance? [1]
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9. Do impurities raise or lower the boiling point of water? [1]
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10. A liquid boils at 100 °C exactly. Is it likely to be pure water? Give a reason. [2]
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11. Sample X melts at 0 °C; sample Y melts from –4 °C to –1 °C. Which is pure water? [1]
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12. Why do medicines need to be very pure? [2]
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13. Name ONE other method (apart from melting point) for checking whether a dye is pure. [1]
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14. Explain why measuring a melting point once is less reliable than repeating it three times. [2]
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4. Before you hand it in

"Pure means natural or healthy."

In chemistry, pure means only one substance. Pure honey is a mixture; pure arsenic is pure but poisonous.

"Compounds are mixtures because they have more than one element."

A compound on its own is a pure substance.

"Impure substances have a higher melting point."

Impurities LOWER the melting point and make it melt over a range; they RAISE the boiling point.

"Clear liquids are pure."

Sea water and sugary water look clear but are mixtures. Test with a boiling point or chromatography.