GRADE 7 SCIENCE

Pure & Impure Substances

Name: Date:

INQUIRY

A bottle of 'pure' mineral water from Nanjing contains dissolved minerals. Is it REALLY pure in the scientific sense?

Discuss with your partner. Write your initial ideas below:

Key Vocabulary

Term	Definition
Pure substance	Contains only ONE type of element or compound.
Impure substance	A mixture of two or more substances.
Melting point	Pure substance: sharp exact temperature. Impure: range.
Boiling point	Pure substance: sharp exact temperature. Impure: higher than expected.

Part A — Pure or Impure?

1. Classify each as pure or impure IN THE SCIENTIFIC SENSE: (a) distilled water (b) Nanjing tap water (c) oxygen gas (d) air (e) gold (24 carat) (f) Korean soju (g) pure ethanol (h) German 'pure' orange juice. [4 marks]

Part B — Testing Purity

2. Pure water boils at exactly 100 degrees C. A student boils tap water from Nanjing and finds it boils at 100.3 degrees C. (a) Is the tap water pure? (b) Explain why the boiling point is higher. [3 marks]

3. A substance melts between 78 and 83 degrees C. A pure sample of the same substance should melt at 80 degrees C. (a) Is the sample pure? (b) What evidence tells you? (c) How could you purify it? [3 marks]

Part C — Choosing Techniques

4. For each mixture, state the best separation technique and explain WHY: (a) Sand mixed with water (b) Salt dissolved in water (you want the salt) (c) Salt water (you want pure water) (d) Coloured dyes in a food sample (e) Alcohol and water. [5 marks]

5. German beer law (Reinheitsgebot, 1516) says beer must contain only water, barley, hops, and yeast. Is beer 'pure' in the scientific sense? Explain. What separation techniques were used in brewing? [3 marks]