Experiments with particles – teacher notes

Introduction

Students measure any changes in volume when solids are mixed with solids, salt is dissolved in water, and alcohol is mixed with water.

Equipment

Apparatus

- Eye protection
- Stirring rod
- Measuring cylinders, 100 cm^3, x2
- Spatula

Chemicals

- Sodium chloride
- Water
- Sand
- Dried peas
- Ethanol

Health, safety and technical notes

- Read our standard health and safety guidance here https://rsc.li/3W2bO5u
- Always wear eye protection.
- Ethanol is flammable, see CLEAPSS Hazcard HC040a.

Notes

Ensure that the students understand what is meant by prediction.
Students should be encouraged to suggest explanations for their results, even if the inferences seem not to support their predictions – eg 25 cm^3 peas + 25 cm^3 sand = 46 cm^3 total volume.
A student may feel that water and alcohol are continuous materials, with the heavier one resting on the other – therefore squashing the lighter one.
The effect would be to have a lower total volume.
Students may need reminding not to try and measure 25 cm^3 accurately but to pour approximately, then take an accurate measurement.

Answers

1. Both activities involve the mixing of particles, combined volumes are less than the sum of the parts.
2. Salt particles mix between the water particles is a simple explanation.