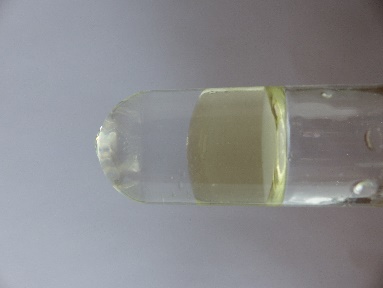
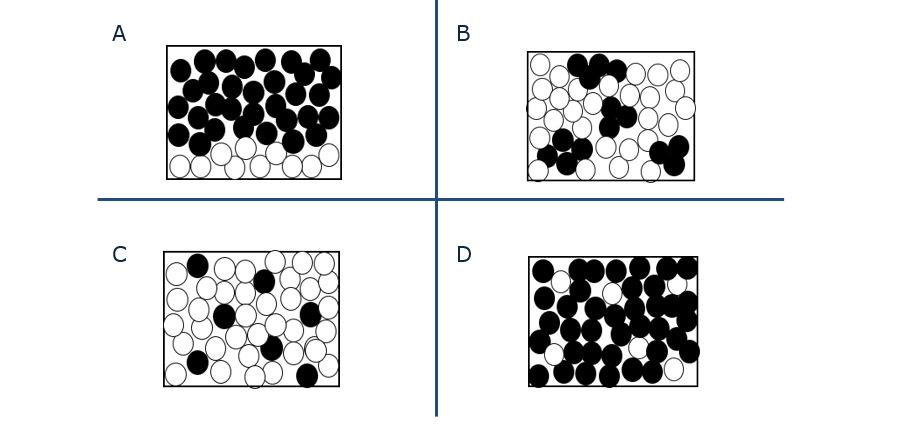
**Particle diagram matching**

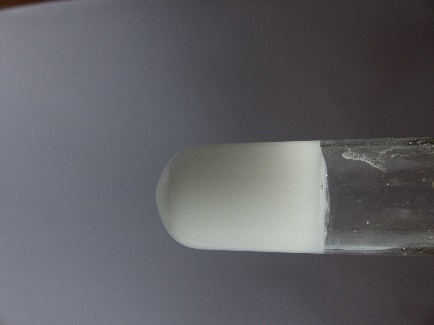
1. Some oil and water are poured into a test tube.

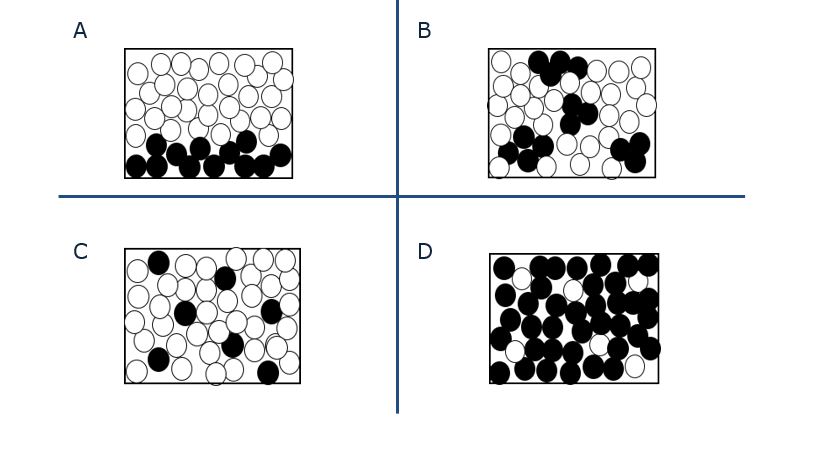


Which particle diagram do you think is the best representation?



1. Some chalk powder is mixed with water.



Which particle diagram do you think is the best representation of the suspension? 

*Chemistry > Big idea CPS: Particles and structure > Topic CPS1: Substances and mixtures > Key concept CPS1.1: Particles in solutions*

|  |
| --- |
| **Response activity** |
| **Particle diagram matching** |

|  |  |
| --- | --- |
| Learning focus: | Understand how a particle model of matter can be used to describe and explain solutions. |
| Observable learning outcome: | Use the particle model to represent a solute dissolved in a solvent. |
| Activity type: | simple multiple-choice |
| Key words: | dissolve, particle, solution, suspension |

This activity can help develop students’ understanding by addressing the misunderstandings revealed by the following diagnostic question:

* Solution diagram

**What does the research say?**

Johnstone (1991) explains the difficulties that many students face in understanding science as the degree of ‘multilevel’ thought required. In chemistry students are frequently required to think about very different types of thing all at once.

Johnstone presented this in the form of a triangle:



*(after Johnstone, 1991, p78)*

Jaber and Boujaoude (2012) carried out research into whether a macroscopic-sub-microscopic-symbolic teaching approach could improve students’ relational understanding of chemical reactions. Their research showed that most students were able to interpret chemical reactions at the macroscopic level but that they tended to apply macroscopic reasoning to explain phenomena at the sub-microscopic level. They also frequently regarded models, that are designed to support explanations, as exact copies of reality. Their research focused on the explicit teaching of concepts at the micro, sub-microscopic and symbolic levels at first discretely and then interrelated. Their research showed an improvement in students’ relational understanding.

**Ways to use this activity**

Students should discuss which particle diagram best matches the macroscopic observation of a mixture that is provided.

*Differentiation*

Some students may find it easier to move from the sub-microscopic to the macroscopic and so could be encouraged to think through what each particle diagram represents macroscopically.

**Expected answers**

1 A

2 B

**Acknowledgments**

Developed by Helen Harden (UYSEG).

Images: Helen Harden

**References**

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