

Mixtures

What do they look like?



This activity accompanies the *Education in Chemistry* article 'How to teach mixtures and solutions' by David Paterson: rsc.li/2FxsuyJ



Preparation

- Prepare a set of containers (eg jam jars, plastic pots) that contain different arrangements of simple objects (eg marbles, beads).
- An example set:
 - Just red, just blue, just yellow and just green beads in separate pots
 - A mixture of red and yellow beads
 - A mixture of green and blue beads
 - A mixture of yellow, blue and green beads
 - A mixture of yellow, blue, green and red beads
 - A mixture of smaller and larger red beads





Preparation

- Prepare a set of sealed boiling tubes containing:
 - salt
 - sand
 - salt and sand
 - copper turnings
 - zinc granules
 - copper turnings and zinc granules



Investigation

- You have 2–3 minutes in your groups to look at and discuss the contents of the pots.
- You should think about:
 - Which contain mixtures?
 - How can you tell?
 - What properties of the ‘particles’ are to make this decision?
- Be ready to feedback to the class.



Group feedback

- Which pots contain mixtures?
- How can you tell?
- What properties of the 'particles' are you using to make this decision?
- Do you agree/disagree with what other groups are saying? Explain why.



Pure substances

- Here we have
 - red 'particles'
 - blue 'particles'
 - yellow 'particles'
 - green 'particles'
- Each container only contains only one type of particle – so these are pure substances.





Mixtures

- Here we have
 - red and yellow ‘particles’ together
 - green and blue ‘particles’ together.
- The containers have two different types of particles in – so these are mixtures.





Mixtures

- Here we have
 - Blue, green and yellow 'particles' together
 - Blue, green, yellow and red 'particles' together
- The containers have more than one type of particles in – so these are mixtures.





Mixtures

- Here we have
 - red and yellow ‘particles’ together
- We also have two pots containing only red ‘particles’.
 - small and large ‘particles’
 - medium and large ‘particles’
- All the pots contain mixtures – the ‘particles’ differ by colour or size.
- Different properties can make ‘particles’ different.



Investigation

- You have 2–3 minutes in your groups to look at and discuss the contents of the boiling tubes
- You should think about:
 - Which contain mixtures?
 - How can you tell?
 - What properties of the contents are you using to make this decision?
- Be ready to feedback to the class.



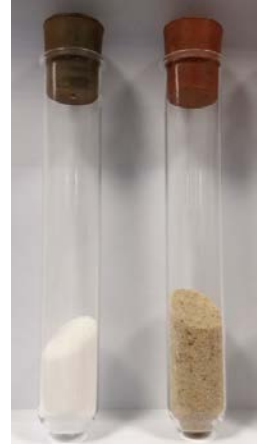
Group feedback

- Which contain mixtures?
- How can you tell?
- What properties of the contents are you using to make this decision?
- Do you agree/disagree with what other groups are saying? Explain why.



Pure substances

- Here we have
 - salt
 - sand
 - zinc pieces
 - copper pieces
- Each boiling tube only contains one chemical substance – these are pure substances.



Mixtures

- Here we have
 - sand and salt
 - zinc and copper
- The containers have more than one chemical substance in – so these are mixtures.



Mixtures

- The 'particles' in the pot are the beads. Large red beads are different to small red beads so this counts as a mixture.
- In the tube, the copper pieces are different sizes. However, they are all made of copper atoms, and all copper atoms are the same. Therefore, this doesn't count as a mixture.

